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THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

> "………… .. per litora spargite muscum,
> Naiades, et circum vitreos considite fontes:
> Pollice virgineo teneros hic carpite flores
> Floribus et pictum, divæ, replete canistrum.
> At vos, o Nymphæ Craterides, ite sub undas,
> Ite, recurvato variata corallia trunco
> Vellite muscosis e rupibus, et mihi conchas
> Ferte, Deæ pelagi, et pingui conchylia succo."
>
> *N. Parthenii Giannettasii*, Ecl. 1.

No. 31. JULY 1920.

I.—*Undescribed Species of African Crane-flies in the Collection of the British Museum (Natural History)* : Tipulidæ, *Diptera.*—Part I. *Subfamily* Limnobiinæ. By CHARLES P. ALEXANDER, Ph.D., Urbana, Illinois, U.S.A.

FOR several years past the writer has been engaged in the preparation of a monographic revision of the Tipuloidean flies of the Ethiopian Region. During the progress of this study the collections of many of the Museums in America, South Africa, and Europe were kindly sent me for study by the authorities in charge. The largest and most important collections of tropical African crane-flies are those contained in the British Museum of Natural History, and it is with the deepest appreciation and thanks that the writer acknowledges the kind assistance of Mr. F. W. Edwards in securing the loan of these unrivalled collections. The species herein diagnosed as new will be keyed, and many of them figured, in the forthcoming revision mentioned above.

Family Tipulidæ.

Subfamily *LIMNOBIINÆ*.

Tribe LIMNOBIINI.

Genus DICRANOMYIA, Stephens.

Dicranomyia scutellum-nigrum, sp. n.

Head dark; mesonotal præscutum and postnotum yellowish, the scutal lobes and scutellum black; pleura yellow with a transverse dark brown stripe on the mesepisternum; wings long and narrow, yellow, with about four dark brown cross-bands, the second at the level of the sector, the third at the cord, the last at the wing-tip; *Sc* long, cell *1st* M_2 closed.

Female.—Length about 8·5 mm.; wing about 9 mm.; middle leg, femur, 8·5 mm.; tibia, 8·9 mm.

Rostrum and palpi brownish yellow, the latter a little the darker, short. Antennæ with the scapal segments obscure yellowish, the second segment dark brown at the tip; flagellum rather elongate, dark brown, each segment with a very long, secund verticil. Head dark brown.

Mesonotal præscutum shiny yellowish red without darker markings; scutal lobes brownish black, the median area and base of the scutellum obscure yellow; remainder of the scutellum blackish; postnotum yellowish. Pleura shiny yellowish with a single, rather narrow, transverse, dark brown stripe on the mesepisternum, continued ventrad on to the dorsal margin of the mesosternum, this line extending from the concolorous scutal lobes, passing immediately before the wing-root. Halteres yellow, the knobs dark brown. Legs with the coxæ and trochanters yellow; femora brown, pale at the base, passing into dark brown at the apex; tibiæ brown, the tips dark brown; tarsi dark brown; legs relatively long and slender; claws broken. Wings long and relatively narrow, light yellowish, with about four brown cross-bands; these markings are dark brown in the costal region but fade into grey in the anal cells; these bands are distributed as follows: the first band lies just beyond the yellowish wing-base and completely traverses the wing, occupying the middle third of cell *2nd A*; the second band occupies the level of the origin of *Rs*, appearing as a large, dark brown area at this origin, continued caudad across the wing as a much paler, grey cloud; the third band occupies the cord and completely traverses the wing, paler in the caudal cells; a large rounded brown spot at the tip of R_1;

wing-tip extensively darkened, this including the outer halves of cells *2nd* R_1, R_3, R_5, all of *2nd* M_2 and M_3, and the apices of Cu_1 and *Cu*; the outer end of cell *1st* M_2 is seamed with brown, confluent with the dark wing-apex. Venation: *Sc* long, Sc_1 ending opposite the fork of *Rs*, Sc_2 at the tip of Sc_1; *Rs* long, strongly arcuated at origin; *r* at the tip of R_1; basal deflection of R_{4+5} less than twice the length of *r*; cell *1st* M_2 closed, large, longer than the veins beyond it; the remainder of the wing-tip is injured and cannot be described.

Abdominal tergites reddish yellow, the bases of the segments more or less blackish, this most distinct on tergites six and seven where it occupies about the basal half of the segment; on the basal and intermediate segments these marks are much paler; sternites similar, the black markings on segments six and seven distinct. Ovipositor with the valves chitinized, but relatively short and stout; sternal valves black at the base on either side of the median line, the tips acute; the weak and rather slender tergal valves are bent upward at about mid-length.

Hab. Southern Nigeria.

Holotype, ♀, Ilesha, September 18, 1910, caught in house, 1 P.M. (*Capt. L. E. H. Humfrey*).

Presented by the Entomological Research Committee, 1911–422.

Type in the collection of the British Museum (Natural History).

Dicranomyia woosnami, sp. n.

General coloration light yellow; antennæ yellow; tips of the femora and tibiæ narrowly darkened, claws simple; wings hyaline, with sparse, small, brown spots; abdominal tergites marked with brown triangular cross-bands; ovipositor with the tergal valves very small, strongly curved.

Female.—Length about 6 mm.; wing 6·8 mm.

Rostrum and palpi dark brown. Antennæ with the first scapal segment dark brown, remainder of the antennæ light yellow, the terminal three segments very slightly darkened; flagellar segments long-oval with rather long, black verticils. Head dark brown, the vertex narrow.

Mesothorax clear shiny yellow without dark markings; metanotum dark brown. Halteres pale, the knobs a little darker than the stem. Legs with the coxæ and trochanters pale yellow; femora yellow, the tips narrowly dark brownish black; tibiæ brownish yellow, the tips very narrowly dark brown; tarsi brown; claws slender, untoothed. Wings hyaline, iridescent, with small brown spots arranged as follows: at the origin of *Rs*; fork of *Sc*; tip of R_1 and on *r*; very narrow and indistinct seams along the cord and outer end of cell *1st* M_2 and a conspicuous spot at the end of vein *2nd A*; veins slender, dark brown. Venation: *Sc* rather short, Sc_1 ending a short distance beyond the origin of *Rs*; Sc_2 at the tip of Sc_1; *Rs* strongly angulated and spurred at origin; *r* at the tip of R_1; basal deflection of R_{4+5} about equal to the basal deflection of M_{1+2}; cell *1st* M_2 large, rectangular, about as long as vein M_{1+2} beyond it; *m* a little shorter than the outer deflection of M_3; basal deflection of Cu_1 at or just beyond the fork of *M*.

Abdomen pale brownish yellow, the tergites with a broad-triangular brown band at the caudal margin of segments one to six, smallest on the sixth segment. Ovipositor with the tergal valves very tiny, slender, strongly upcurved, the tips acute; sternal valves brown, the bases blackened, very long and powerful, gently upcurved, the tips broad, obliquely truncated, and minutely angulated.

Hab. British East Africa.

Holotype, ♀, Kericho, altitude 5500 feet, November 1, 1912 (*R. B. Woosnam*). B.M. No. 1914. 2.

Type in the collection of the British Museum (Natural History).

The species is dedicated to the collector, Mr. R. B. Woosnam.

Genus Limnobia, Meigen.

Limnobia trichoptera, sp. n.

Head black; antennæ black, the verticils unusually long; pronotum and mesonotum with a broad, median, black stripe; præscutum with brown lateral stripes; femora with one or two yellow rings before the tip; wings pale brown with darker costal markings and numerous small, pale yellowish, subhyaline areas in all the cells; distal cells of the wings with numerous macrotrichia; *r* at the tip of R_1, basal deflection of Cu_1 before the fork of *M*.

Male.—Length 7·5 mm.; wing 9·5 mm.

Female.—Length about 7·5 mm.; wing 9·8–10 mm.

Rostrum and palpi dark brownish black. Antennæ black, the flagellar segments elongate, attenuate, with very long delicate verticils. Head deep velvety black.

Pronotum velvety black. Mesonotal præscutum light yellow with a broad, black, median stripe which splits behind into two divergent arms enclosing a yellowish triangular area between them, this lying immediately before the suture; lateral stripes broad, dark brown; scutum with the lobes brown: scutellum obscure yellowish; postnotum pale yellowish brown, the sides darker. Pleura pale brownish yellow with indications of darker brown clouds on the mesepisterna. Halteres moderately long and slender, dark brown, the extreme base paler. Legs with the coxæ pale brownish yellow; trochanters dull yellow; in the male allotype the femora are brown with a single yellow ring before the broad brown apex, a narrow yellow median area being barely indicated; in the females, however, the femora are pale brown, more yellow on the outer half, with a narrow blackish postmedial ring and a slightly narrower and paler subapical ring, the tip broadly yellow; tibiæ black, the extreme bases a little paler; tarsi black. Wings pale brown with darker brown marks along the costal region, the first at the arculus, the third at the origin of *Rs*, the fourth at the tip of Sc_1; stigma rectangular, dark brown; cord and outer end of cell 1*st* M_2 narrowly seamed with brown; remainder of the wing-surface variegated with yellowish spots and blotches, these occurring in all the cells, the more conspicuous being as follows: before and beyond the stigma; before the wing-tip in cells 2*nd* R_1 and R_3 before the cord, in cell 1*st* M_2, in the bases and before the tips of cells 2*nd* M_2 and M_3, in cell *Cu* before the basal deflection of Cu_1, near the end of *Cu*, 1*st A*, and 2*nd A*; veins dark brown; apical cells of the wing with macrotrichia, these including the stigma, cell 2*nd* R_1, the outer half of R_3 and R_5, all but the base of 2*nd* M_2, M_3, and the extreme tip of Cu_1. Venation: *Sc* long, ending about opposite mid-length of *Rs*, Sc_2 at the extreme tip of Sc_1 and more than twice its length; *Rs* strongly angulated at origin; *r* at the tip of R_1; veins R_{2+3} and R_{1+5} running parallel to one another, so cell 2*nd* R_1 is very wide at the wing-margin; cell 1*st* M_2 closed, about as long as vein Cu_1 beyond it; basal deflection of Cu_1 before the fork of *M*, this distance longer than *r–m*.

Abdomen short in both sexes; tergites pale brown, the sternites yellowish; a blackish spot at the posterior lateral angles of the sternites. Male hypopygium with the pleurites rather small, on the proximal face with a large fleshy appendage, which is provided with long coarse hairs; pleural appendages small. Gonapophyses appearing as flattened plates, each terminating in an acute blackened point that is directed caudad and slightly laterad. Ovipositor with the valves slender but weak, the tergal valves gently upcurved, the sternal valves blackened beneath at the base.

Hab. Rhodesia, Uganda.

Holotype, ♀, Mt. Chirinda, Melsetter District, Southern Rhodesia, altitude 3500 feet, June 11, 1911 (*C. F. M. Swynnerton*), collector's no. 3625.

Allotype, ♂, Mt. Kokanjero, S.W. of Elgon, Uganda, altitude 6400 feet, August 9, 1911 (*S. A. Neave*). B.M. no. 1913. 110.

Paratopotype, ♀.

Presented by the Entomological Research Committee, 1912. 145.

Type in the collection of the British Museum (Natural History).

Limnobia rhanteria, sp. n.

Head dark grey with a median brown line; antennæ dark brownish black, the tips of the individual segments paler; mesonotal præscutum pale brown with four indistinct, darker brown stripes; thoracic pleura with a broad dark stripe, with a silvery stripe ventrad of it; femora with the tips yellow, with a subapical brown ring in this yellow portion; wings pale yellow, dotted and sprinkled with pale brown in all the cells; stigma with yellow centre; abdominal tergites brown, the sternites brownish yellow.

Male.—Length about 5·5–6 mm.; wing 9·5–10·4 mm.

Rostrum and palpi dark brown. Antennæ dark brownish black, the flagellar segments indistinctly tipped with paler; the elongate first scapal segment is dusted with grey; flagellar segments oval, narrowed at the ends. Head dark grey with a median black stripe.

Pronotum pale brown, rather prominent. Mesonotal præscutum pale brown with four indistinct darker brown stripes, the median pair divided by a very indistinct, capillary median line; scutal lobes dark brown, the remainder of the scutum pale brownish yellow; scutellum pale brown, a little darker laterally, continued caudad from the dark scutal lobes; postnotum dark brown. Pleura pale brown with a darker chestnut-brown stripe extending from the fore coxæ to the base of the halteres, the mesosternum likewise dark brown, the space between these dark marks silvery pruinose. Halteres long and slender, dark brown, the base of the stem abruptly light yellow. Legs long and slender with the coxæ and trochanters reddish yellow; femora with the basal quarter pale, thence passing into dark brown, the tip broadly yellow, enclosing a brown subapical annulus, this being a little broader than the actual yellow tip; tibiæ and tarsi dark brown. Wings pale yellow, cells *C*, *Sc*, and *1st* R_1 brighter yellow; wing-surface marbled and sprinkled with pale brown spots and clouds; stigmal area enclosing a pale yellow spot immediately before *r*; the marks at the origin of *Rs* and along the cord are somewhat darker brown, the middle half of *Rs* being yellow, the ends surrounded by these brown seams; *2nd Anal* cell largely occupied by a brown cloud; compared with the somewhat similar *L. sokotrana*, the markings are fewer in number and more confluent. Venation: *Sc* moderately long, Sc_1 ending a short distance before the fork of *Rs*, Sc_2 at the tip of Sc_1; *r* at the tip of R_1; basal deflection of Cu_1 at or a short distance before the fork of *M*.

Abdominal tergites brownish, the sternites brownish yellow; hypopygium pale brown.

Hab. Uganda, British East Africa.

Holotype, ♂, Hill Bembadalada, May 26, 1911 (*Dr. C. H. Marshall*).

Paratype, ♂, Fort Hall, British East Africa, May 1, 1912 (*W. C. Prichard*).

Presented by the Entomological Research Committee, 1912. 109, 1913. 394.

Type in the collection of the British Museum (Natural History).

The paratype male is much less distinctly marked than the type above described, but almost surely refers to the same species.

Limnobia pœcila, sp. n.

Head brown; antennæ dark brown, the flagellar segments oval; pronotum and mesonotal præscutum reddish brown with a broad median stripe; pleura reddish brown; legs dark brownish black, the femora with an indistinct, narrow, reddish ring before the tip; wings yellowish subhyaline with brown spots and dots that are found in all the cells, but are more distinct and clear-cut in the cells of the costal half, paler and ill-defined in the cells of the caudal half of the wing; abdomen dark brown.

Male.—Length 8 mm.; wing 10·1 mm.; fore leg, femur 8·4 mm., tibia 10·8 mm.

Rostrum and palpi dark brown. Antennæ dark brown, the flagellar segments oval. Head dark brown.

Pronotum dark brownish black, the sides reddish yellow.

Mesonotal præscutum reddish brown with a broad, brown, median stripe; scutal lobes dark brown; median area of the scutum and the base of the scutellum obscure yellow; remainder of the mesonotum dark brown. Pleura reddish brown without stripes. Halteres moderately elongated, the stem obscure yellow, passing into the dark brown knobs. Legs with the coxæ and trochanters brownish yellow; femora dark brownish black, the bases a little paler; a very obscure, narrow, reddish ring before the broad black tip; remainder of the legs black. Wings with a faint yellow tinge, with brown spots and dots scattered in all the cells, these heavier and more distinct in the cells of the costal half of the wing, very pale, ill-defined, and confluent in the caudal cells; these marks consist of a series of brown spots in cells *C* and *Sc*; a large brown spot at the origin of *Rs*, including cell *Sc*; a larger spot at the tip of Sc_1; stigma oval, dark brown, entire; wing-tip at the end of vein R_{2+3} darkened; the spots in the radial cells are more scattered, but in the caudal cells they are so numerous and approximate that their limits become ill-defined and the general coloration of these cells of the wing becomes pale brown; veins dark brown. Venation: Sc_1 ending almost opposite or but slightly before the fork of *Rs*; Sc_2 at the tip of Sc_1; *r* at the tip of R_1 and subequal to this tip; basal deflection of Cu_1 at the fork of *M*.

Abdominal segments dark brown, the centres of the disk more reddish; hypopygium brown,

Hab. Gold Coast.

Holotype, ♂, Bibiani, October, 1910 (*Dr. H. G. F. Spurrell*).

Type in the collection of the British Museum (Natural History).

Limnobia pœcila is generally similar to *L. rhanteria*, but is readily told by the diagnostic characters listed above.

Limnobia sokotrana, sp. n.

Antennæ black, the segments not conspicuously elongated, verticils short; vertex very narrow between the eyes; mesonotum obscure greenish yellow with a broad blackish median stripe; pleura yellow, with a conspicuous, longitudinal, brown stripe; halteres with the knobs yellow; legs with the femora long and slender, light brown, the tips dark brown and with a yellowish subapical ring; wings pale greyish yellow, with a few brown spots and seams at the ends of the veins in the costal region and along the cord; all the cells of the wing dotted with pale brownish grey;

cell 1*st* M_2 closed, basal deflection of Cu_1 just beyond the fork of *M*; abdominal segments yellowish, the basal tergites dark brown.

Male.—Length about 9·5 mm.; wing 11·5 mm.; hind leg, femur 10 mm., tibia 9·2 mm.

Rostrum slightly elongate, dark brownish black; palpi black. Antennæ dark brown throughout; first scapal segment elongated; basal flagellar segments enlarged, subglobular, the distal segments cylindrical, the verticils shorter than the segments that bear them; terminal flagellar segment nearly twice as long as the penultimate, deeply constricted at mid-length to appear as two. Head dark brown; vertex between the eyes very narrow, so that the eyes are almost contiguous.

Pronotum obscure yellowish. Mesonotal præscutum obscure greenish yellow with a broad, brownish-black, median stripe that broadens out behind; scutal lobes largely blackish brown; scutellum and postnotum similar, sparsely grey-pruinose, the sides at the base paler. Pleura obscure yellow with a narrow, dark brown, longitudinal stripe extending from the propleura, passing above the fore coxæ and base of the halteres to the postnotum; mesosternum similarly dark brown. Halteres with the knobs and bases of the stem yellowish, the remainder of the stem pale brown. Legs with the coxæ yellow, the posterior coxæ darker; trochanters dull yellow; femora rather long and slender, light brown, the tips narrowly (1–1·1 mm.) dark brownish black; a dull yellowish subapical ring; tibiæ and tarsi dark brown; claws with four basal teeth. Wings with a pale greyish-yellow tinge, costal and subcostal cells more yellowish; membrane with a few brown spots and seams, and numerous pale brownish-grey dots in the cells; the larger brown markings are as follows: At *h*; at the origin of *Rs*, continued along the vein to beyond a third its length; tip of Sc_1; at the tip of R_1 and along *r*; as seams along the cord and outer end of 1*st* M_2; the small pale dots are well scattered over all the cells; there is a small yellowish area near the end of cell 1*st* R_1, immediately before *r*, giving a somewhat ocellate appearance to the stigma. Venation: *Sc* long, ending but a short distance before the fork of *Rs*, Sc_2 at the tip of Sc_1 and subequal to it; *Rs* long, gently arcuated; *r* at the tip of R_1; R_{2+3} rather arcuated at origin, thence running parallel to R_{4+5}; basal deflection of R_{4+5} about one-half longer than *r–m*; cell 1*st* M_2 closed, long-pentagonal, *m* being about two-fifths the length of the long outer deflection of M_3; basal deflection of Cu_1 immediately before the fork of *M*.

Abdominal tergites one and two, and the sides of three dark brown; caudal margin of segments two to seven obscure yellow, the remaining tergites reddish yellow; sternite yellow.

Hab. Island of Sokotra.

Holotype, ♂, Adho, Diemellus, altitude 3500 feet, February 15, 1899 (*W. R. O.-Grant*), B.M. no. 1903. 75.

Type in the collection of the British Museum (Natural History).

Limnobia nyasaensis, sp. n.

Antennæ black, the flagellar segments pale at their tips; head dark-coloured, grey-pruinose; mesonotum reddish yellow with an anterior dark brown median stripe on the præscutum; femora with the tips broadly dark brown; wings pale yellow, the costal and subcostal cells brighter, the membrane dotted with brown, the origin of *Rs* and *r* seamed with darker brown.

Male.—Length about 6 mm.; wing 9·3 mm.

Female.—Length about 8 mm.; wing 9·4 mm.

Rostrum and palpi dark brownish black. Antennæ black, the distal ends of the intermediate segments pale to produce a bicolorous appearance; basal flagellar segments subglobular, the intermediate oval, the distal segments elongate-oval. Head dark-coloured, grey-pruinose.

Pronotum reddish yellow with a dark brown median stripe. Mesonotal præscutum similar, with an anterior dark brown median line that becomes bifid and obliterated at about mid-length of the sclerite; remainder of the mesonotum and the pleura reddish yellow. Halteres rather long and slender, pale brown, the knobs dark brown. Legs with the coxæ and trochanters reddish yellow; femora brownish yellow, the tips broadly dark brown; tibiæ light brown, the tips narrowly dark brown; tarsi dark brown. Wings pale yellow, the costal and subcostal cells brighter; a dark brown seam at the origin of *Rs* and along *r* and the tip of R_1; narrow, paler brown seams along the cord and outer end of cell 1*st* M_2; scattered pale brown dots in all the cells as in *L. irrorata*, their number and position somewhat variable. Venation: *Sc* rather long, ending opposite about two-thirds the length of *Rs*, Sc_2 at the tip of Sc_1; *r* at the tip of R_1, the latter being equal to or about twice the length of the former; cell 1*st* M_2 closed, irregularly pentagonal, *m* being less than one-half the outer deflection of M_3; basal deflection of Cu_1 shortly before the fork of M.

Abdomen reddish brown.

Hab. Nyasaland.

Holotype, ♂, Mlanje, January 20, 1913 (*S. A. Neave*).

Allotopotype, ♀, January 24, 1913.

Presented by the Entomological Research Committee, 1913. 236.

Type in the collection of the British Museum.

Limnobia nyasaensis is close to *L. irrorata* (Enderlein), but differs in the broad dark brown femoral tips and the conspicuous dark brown seams at the origin of *Rs* and along *r* and the tip of R_1.

Limnobia humfreyi, sp. n.

Antennæ brown; head dark grey; pronotum dull yellow with a broad black median stripe; mesonotum black, the humeral angles of the præscutum yellow; pleura obscure yellowish; halteres black, the basal third of the stem yellow; femora dark brown, the tips black; wings subhyaline, costal and subcostal cells dark brown; cord, outer end of cell 1*st* M_2, and the wing-tip brown; abdominal tergite orange-yellow with segments two, six, and seven black.

Male.—Length about 11 mm.; wing 11 mm.

Rostrum and palpi dark brown. Antennæ with the scapal segments brown, the flagellar segments a little darker brown; flagellar segments oval, the distal segments a little more elongate, the longest verticils about one-half longer than the segments that bear them. Head dark grey, the eyes very large, the vertex between them narrowed to a linear strip.

Pronotum dull yellow with a broad black median stripe. Mesonotal præscutum dull yellow with a broad black median stripe that is broadened out behind near the suture to include the whole posterior half of the sclerite; scutal lobes black, the median area a little paler; scutellum and postnotum dark brownish black. Pleura obscure yellowish without darker markings. Halteres black, the basal third of the stem abruptly light yellow. Legs with the coxæ and trochanters dull yellow; femora dark brown, the tips black; tibiæ black, the extreme bases paler; tarsi black. Wings subhyaline, the costal and subcostal cells dark brown; stigma dark brown, hairy; brown spots and seams at the origin of *Rs*, along the cord and outer end of cell 1*st* M_2; a less distinct mark at arculus; the wing-tip is broadly infuscated, this including all but the base of cell 2*nd* R_1, the outer half of cells R_3 and R_5, all but a spot at the base of cell *2nd* M_2, all of M_3, all of Cu_1, except a large subbasal spot, and the margins of the remaining cells of the wing; veins dark brownish black. Venation: *Sc* long, Sc_1 ending a short distance before the fork of *Rs*, Sc_2 at the tip of Sc_1; *Rs* angulated and slightly spurred at origin; *r* on the tip of R_1 and long, nearly equal to the basal deflection of Cu_1; basal deflection of R_{4+5} nearly three times the length of *r–m*; cell *1st* M_2 long, narrow, a little widened distally, much longer than vein Cu_1 beyond it; basal deflection of Cu_1 just before the fork of *M*.

Abdominal tergite one light orange-yellow; two black, except at the extreme base; three orange, the caudal margin indistinctly darkened; four orange; five with the basal half orange, the caudal half and all of segments six and seven black; eight and nine and the hypopygium orange; sternites orange, segments three and the subterminal ring of the tergites occurring on the sternites also, black.

Hab. Southern Nigeria.

Holotype, ♂, Ilesha (*Capt. L. E. H. Humfrey*).

Presented by the Entomological Research Committee, 1911. 422.

This handsome species is closely allied to *L. congoensis*, Alexander (Belgian Congo), and several other species described at this time. It is with pleasure that the fly is dedicated to Captain Humfrey as an appreciation of the labour involved in collecting numerous Tipulidæ in Southern Nigeria.

Limnobia grahami, sp. n.

Head dusky black, a narrow median line and the margins of the eyes light grey; mesonotum brownish black, only the narrow humeral regions of the præscutum yellowish; mesopleura and mesosternum with a conspicuous transverse dark brown area; legs black; abdomen with segments one, four, eight, and nine yellow, two, three, five, six, and seven black.

Male.—Length about 9·5 mm.; wing 10·3 mm.

Rostrum and palpi dark brownish black. Antennæ with the first scapal segment dark brown, the second segment dark brown basally, the tip paler; flagellar segments elongate-cylindrical, the verticils longer than the segments. Head with the vertex blackish; the median area and the narrow margins adjoining the eyes light grey; the dusky black areas of the vertex and occiput bear numerous black bristles; vertex between the eyes narrowed at the hinder part of the eyes, at the narrowest part rather light brown.

Pronotum yellowish, narrowly dark brown medially. Mesonotal præscutum brownish black, sparsely dusted with grey, especially behind; humeral region very narrowly dull yellow; remainder of the mesonotum black, the median area of the scutum greyish. Pleura obscure yellow, the mesepisternum, mesepimeron, and lateral sclerites of the postnotum dark brown, sparsely dusted with greyish, directly continuous with the median sclerite of the postnotum; sternites similarly dark brownish black. Halteres dark brown, the base of the stem narrowly yellowish. Legs with the coxæ obscure yellow, the outer faces infumed; trochanters brown; legs dark brownish black. Wings nearly hyaline, the costal and subcostal cells dark brown; stigma dark brown, hairy; wing-tip dark brown in cells *2nd* R_1 (except the base), the outer half of R_3 and R_5, all but the base of *2nd* M_2, M_3, and Cu_1, and the apices of the other caudal cells; cord and outer end of cell *1st* M_2 rather broadly seamed with dark brown; a spot at the origin of *Rs*; veins brownish black. Venation as in *L. humfreyi.*

Abdominal tergite one light yellow; two and three black except a narrow basal ring; four orange; five to seven black; eight, nine, and the hypopygium orange; sternites generally similar to the tergites.

Hab. Ashanti.

Holotype, ♂, Obuasi, July 5, 1907 (*Dr. W. M. Graham*); caught on window. B.M. no. 1908. 245.

Type in the collection of the British Museum (Natural History).

Limnobia grahami is very close to *L. humfreyi*, but may be told by the increase of black markings on the mesonotal præscutum, the conspicuous dark area on the mesopleura, the black abdomen with the fourth segment clear orange, and other characters.

Limnobia edwardsi, sp. n.

Mesonotal præscutum yellow with a broad black median stripe; scutal lobes, the distal halves of the scutellum, and the postnotum deep velvety black, basal halves of the scutellum and the postnotum yellow; pleura yellow with a narrow transverse band across the mesopleura and mesosternum, completely girdling the thorax at this point; a dark mark in front of the halteres, the area between these two dark bands conspicuously yellow-pollinose; legs black; wings with the brown seams on the cord broad, cell 1*st* M_2 long; abdominal tergites reddish with a black ring on segments six and seven.

Male.—Length (exclusive of head) about 12 mm.; wing 13 mm.

Head lost in the unique type.

Pronotum pale yellow with a broad median black stripe. Mesonotal præscutum golden-yellow, with a broad black median stripe, at the suture meeting the black scutal lobes, from which extends laterad a narrow black girdle across the pleura and sternum, completely encircling the body; median area of the scutum and the base of the scutellum golden-yellow pollinose; remainder of the scutellum black; postnotum with the basal half golden-yellow pollinose, the caudal half deep velvety black. Pleura light yellow, with a narrow transverse black band on the mesopleura and mesosternum as described above; sides of the postnotum cephalad of the base of the halteres black; the region immediately beneath the wing-root dark brown; the large oval space between these transverse black areas, occupying the mesepimeron and part of the mesosternum, light golden-yellow pollinose. Halteres with the extreme base of the stem dark brown; stem yellow, the knobs broken. Legs with the coxæ and trochanters light reddish yellow; remainder of the legs black, the bases of the fore femora narrowly obscure yellow. Wings pale yellowish subhyaline; cell *Sc* brown, cell *C* brown distally, the basal half pale; stigma oval, hairy, dark brown; a large brown spot at the origin of *Rs* and brown seams along the cord and outer end of cell 1*st* M_2; wing-tip narrowly darkened, this including the outer half of cell 2*nd* R_1 and the extreme outer ends of cells R_3, R_5, 2*nd* M_2, M_3, Cu_1, and *Cu*; distal two-thirds of cell 2*nd A* greyish; vein *Cu* distinctly and rather broadly seamed with brown; the other longitudinal veins more narrowly and less distinctly seamed with brown, more distinct on the outer half of the wing; veins dark brownish black. Venation: *Sc* long, ending a short distance before the fork of *Rs*, Sc_2 at the tip of Sc_1; *Rs* slightly angulated at origin; *r* at the extreme tip of R_1 and more than twice the length of this tip; basal deflection of R_{4+5} about two-fifths the length of *Rs*; cell 1*st* M_2 long and comparatively narrow, longer than any of the veins issuing from it, its inner end arcuated, lying proximad of *r–m*; basal deflection of Cu_1 and short distance beyond the fork of *M*.

Abdominal tergite one yellow; two reddish with a black ring around the middle; three and four reddish; five reddish with a black ring around the middle; segments six and seven black; eight, nine, and hypopygium reddish; eighth tergite telescoped beneath the seventh.

Hab. British East Africa.

Holotype, ♂, Nairobi, June–July, 1912 (*Dr. A. D. Milne*). B.M. no. 1913. 192.

Type in the collection of the British Museum (Natural History).

It is with great pleasure that this very beautiful *Limnobia* is dedicated to Mr. F. W. Edwards, in appreciation of his critical studies on tropical Tipulidæ.

Limnobia compta, sp. n.

Mesonotal præscutum yellow with a narrow, dark brown, median stripe, before the suture traversed by a broad transverse band that passes across the mesopleura and mesosternum, completely girdling the body; scutum with the lobes black; scutellum light yellow; postnotum black; pleura with a silvery-white area behind the black girdle; halteres black, pale basally; femora obscure brownish yellow, the tips dark brown; wings faintly yellow, with inconspicuous dark markings; basal abdominal segments black, ringed caudally with reddish; segments five to seven black, eight and nine orange.

Female.—Length about 10·5–11·5 mm.; wing 11–11·6 mm.

Rostrum and palpi dark brown. Antennæ with the scapal segments yellowish brown; flagellar segments pale brown, moderately elongated, and with long secund verticils. Head light brown, sparsely grey-pruinose medially, the lateral portions dark brown.

Pronotum yellow with a moderately broad, dark brown, median stripe. Mesonotal præscutum subshiny, dull yellowish with a narrow, dark brown, median stripe that broadens out on the posterior half of the sclerite, before the suture with a broad transverse band that forms a cross with the median stripe; immediately in front of this cross the median stripe is considerably narrowed; the transverse band is continued laterad across the pleura and sternum, completely girdling the body; scutum obscure yellow, the lobes largely shiny black, indistinctly connected with the black pleural band; scutellum conspicuously light yellow-pollinose; postnotum shiny black. Pleura light yellow with a broad, transverse, black band as described above, this including the mesepisternum and mesosternum; lateral pieces of the postnotum immediately before the bases of the halteres black, these two black areas enclosing between them a narrow silvery-white spot. Halteres rather short, black, the basal two-fifths of the stem pale yellow. Legs with the fore coxæ yellow; middle and hind coxæ with the outer faces largely black; trochanters obscure brownish yellow; femora yellowish basally, the tips dark brown, these broadest on the fore legs where less than the basal third is pale, narrowest on the hind legs where it includes only the distal fifth; tibiæ pale brown, the tips narrowly dark brown; tarsi dark brown. Wings with a faint yellowish tinge; the base of the wing before the arculus darkened: basal half of cell *Sc* darkened; stigma oval, hairy, dark brown; narrow and indistinct brown clouds at the origin of *Rs*, along the cord and outer end of cell 1*st* M_2, and as indistinct clouds along the longitudinal veins and in the ends of cells 2*nd* M_2, M_3, Cu_1, and at the end of vein 1*st A*; veins dark brownish black. Venation: *Sc* moderately short, Sc_1 ending but little beyond mid-length of *Rs*, Sc_2 at the tip of Sc_1; *r* at the tip of R_1; cell 1*st* M_2 rather small, not longer than vein Cu_1 beyond it; basal deflection of Cu_1 a short distance before the fork of *M*.

Abdominal segments one to four black, the caudal margins broadly reddish yellow; segments five to seven black, eight and nine orange; valves of the ovipositor short and blunt as in this group of species.

Hab. Southern Nigeria.

Holotype, ♀, Oshogbo (*Dr. T. F. G. Mayer*).

Paratopotype, ♀.

Presented by the Entomological Research Committee, 1911. 422.

Type in the collection of the British Museum (Natural History).

Tribe ANTOCHINI.

Genus CERATOCHEILUS, Wesché.

Ceratocheilus edwardsi, sp. n.

Rostrum about as long as the body; head light grey; mesonotal præscutum light reddish orange; remainder of the mesonotum brown; pleura with a broad dark brown dorsal stripe; wings pale creamy with a heavy dark brown pattern; vein R_{2+3} very long, bisinuous; cell 1*st* M_2 closed, basal deflection of Cu_1 before the fork of *M*.

Male.—Length (excluding rostrum) about 6·3 mm.; wing 4·4 mm.; rostrum about 6 mm.

Rostrum very long and slender, approximately as long as the body, dark brown, the extreme base almost black.

Antennæ dark brownish black. Head clear light grey, the vertex surrounding the antennal bases infuscated; corniculus flattened, sub-oval, narrowed at the base, pale orange, the surface whitish-pubescent. Space between the eyes broad.

Pronotum dark brown. Mesonotal præscutum greatly narrowed and projecting anteriorly over the pronotum, light reddish orange in colour without apparent darker markings; remainder of the mesonotum brown. Pleura pale, with a very broad, dark brown, dorsal stripe extending from the pronotum to the base of the abdomen. Sternum dark brown, this colour continued across the outer faces of the middle and hind coxæ. Halteres pale yellow, the base of the stem a little darker, the knobs large, dark brownish black. Legs with the fore coxæ light-coloured, the middle and hind coxæ more or less infumed on their outer faces; trochanters dull yellow; remainder of the legs dark brown, the femoral bases and the last tarsal segment paler. Wings with a pale creamy tinge, the wing-base and costal region more yellowish; a heavy dark brown pattern as follows:—a small seam at *h*; a large dark brown mark just beyond the arculus, extending from cell *C* to the 1*st Anal* vein; a large seam at Sc_2; a large U-shaped mark at the origin of *Rs*, one branch embracing the tip of Sc_1, the other the tip of R_1, the end of cell *Sc* between being pale, this brown mark continued caudad almost to vein *M*; a large rounded area at the end of vein R_{2+3}; cord and outer end of cell 1*st* M_2 seamed with dark brown; brown spots at the ends of veins of Cu_1, Cu_1, 1*st A*, and 2*nd A*; a large cloud beyond mid-length of vein 1*st A*; a paler brown subapical band extending from cell R_3 to M_3, the extreme wing-tip in cells R_3, R_5, and M_2 creamy white; veins yellow, dark brown in the darkened areas. Venation: R_{2+3} very long for a member of this genus, gently bisinuous, approximately as long as the sector itself, cell R_1 being unusually long; cell 1*st* M_2 closed; basal deflection of Cu_1 before the fork of *M*, the distance a little longer than *m*.

Abdomen dark brown.

Hab. Southern Nigeria.

Holotype, ♂, Ikotobo, November 1913 (*Dr. J. W. Scott-Macfie*).

Presented by the Imperial Bureau of Entomology, 1914. 48.

Type in the collection of the British Museum (Natural History).

This interesting fly is readily told from the other known species of the genus, nine in number, by the long vein R_{2+3} and the very heavy wing-pattern. *Ceratocheilus edwardsi* is dedicated to Mr. F. W. Edwards in appreciation of his critical work in determining the true status of the subfamily Ceratocheilinæ of Wesché and the synonymy of the genera therein included (Ann. & Mag. Nat. Hist. ser. 8, vol. viii. pp. 279–283, 1911).

Genus Elephantomyia, Osten-Sacken.

Elephantomyia nitidithorax, sp. n.

Rostrum longer than the body, dark brown; head grey; mesonotal præscutum shiny brownish yellow with three confluent shiny black stripes; pleura reddish yellow with a sooty-black dorsal area; legs dark brown; wings faintly brownish, stigma dark brown; abdomen dull brownish yellow, the tergites indistinctly ringed with darker brown.

Male.—Length (excluding rostrum) about 7 mm.; wing 8 mm.; rostrum about 6·8 mm.

Rostrum and palpi dark brown, about as long as the body. Antennæ dark brownish black, with fifteen segments, as in the genus, the flagellar segments with very long verticils. Head grey, the vertex between the eyes very narrow.

Cervical sclerites dull yellow. Pronotum dark brown. Mesonotal præscutum shiny brownish yellow with three confluent shiny black stripes, the humeral angles of the ground-colour; scutum shiny yellowish brown; scutellum and postnotum deep brownish black. Pleura shiny reddish yellow; a sooty-black triangular area on the mesepisternum just beneath the margin of the mesonotal præscutum; immediately behind this blackened area and beneath the wing-root a strong erect seta. Halteres brown, the knobs dark brown. Legs with the coxæ and trochanters brownish yellow; remainder of the legs dark brown, the bases of the fore femora narrowly dull yellow. Wings with a faint brownish tinge, a little darker at the apex; stigma oval, dark brown; veins dark brown. Venation as in *E. westwoodi*, Osten-Sacken (genotype), except that *Rs* is a little longer, and angulated or slightly spurred at origin: *Sc* ending just before the fork of *Rs*; basal deflection of Cu_1 but a short distance beyond the fork of *M*, at less than one-fourth the length of cell 1*st* M_2.

Abdominal tergites dull brownish yellow, the basal and posterior margins of the segments narrowly and indistinctly dark brown to produce an annulated appearance; sternites more yellowish; eighth segment uniformly darkened.

Hab. Southern Nigeria.

Holotype, ♂, Yaba, Lagos (*Dr. L. H. Booth*).

Presented by the Imperial Bureau of Entomology, 1911. 55.

Type in the collection of the British Museum (Natural History).

Elephantomyia nitidithorax is closest to *E. wahlbergi*, Bergroth (Caffraria), from which it is distinguished by the different coloration of the præscutum and pleura, the dark brown legs, the differently coloured abdominal tergites, and the venation, the latter assuming that Bergroth's comparison of his species with the genotype, *E. westwoodi*, is correct.

Elephantomyia neavei, sp. n.

Rostrum less than half as long as the body, dark brown; head light brown, pale buffy grey adjoining the eyes; mesonotum buffy brown, the præscutum with a broad brown median stripe; scutal lobes with dark brown centres; wings subhyaline, the stigma pale; cell R_3 at the wing-margin broad; cell 1*st* M_2 very small; basal deflection of Cu_1 before the fork of *M*.

Male.—Length (excluding rostrum) about 7·5 mm.; wing 7·5 mm.; rostrum 3·3 mm.

Rostrum only moderately elongated, slender, dark brown; palpi rather long, dark brown. Antennæ dark brownish black, normal for this genus. Head light brown, pale buffy grey adjoining the inner margins of the eyes; vertex narrow.

Pronotum dark brown. Mesonotal præscutum light buffy brown with a broad, dark brown, median stripe, which is somewhat more reddish anteriorly; scutum light buffy brown, the centres of the lobes dark brown; remainder of the mesonotum pale buffy brown. Pleura pale plumbeous brown. Halteres pale. Legs with the coxæ and trochanters pale brownish yellow; remainder of the legs pale yellowish brown, the terminal tarsal segments darker brown. Wings subhyaline, the bases pale yellow; stigma pale brown; veins pale brown, *Sc* more yellowish. Venation: *Sc* rather short, ending about opposite two-thirds the length of the long straight *Rs*, Sc_2 at the tip of Sc_1; R_{2+3} rather short, parallel with R_{4+5} to near its tip, when it bends slightly cephalad so that cells R_1 and R_3 are approximately equal at the wing-margin; cell 1*st* M_2 very small for a member of this genus, pentagonal, the section of M_{1+2} between r–m and m shorter than the basal section and about equal to m; the fusion of M_3 and Cu_1 longer than any of the other veins that surround cell 1*st* M_2; basal deflection of Cu_1 before the fork of M, this distance about equal to one-half the length of the basal deflection of Cu_1.

Abdominal tergites dark brown, the hypopygium brown, the sternites reddish brown.

Hab. Nyasaland.

Holotype, ♂, Mt. Mlanje, December 5, 1912 (*S. A. Neave*).

Presented by the Entomological Research Committee, 1913. 236.

Type in the collection of the British Museum (Natural History).

This curious fly requires comparison with no other of the known species of the genus. It is dedicated to the collector in appreciation of his efforts in collecting members of this neglected family of flies in Eastern Africa.

Genus DICRANOPTYCHA, Osten-Sacken.

Dicranoptycha atricolor, sp. n.

General coloration deep shiny black, the antennal scape and bases of the fore femora brighter.

Male.—Length about 10 mm.; wing 12 mm.; hind leg, femur 9 mm., tibia 10·3 mm.

Rostrum and palpi dark brown. Antennæ with the scape dark brown, the flagellar segments black. Head dark brown.

Pronotum and mesonotum deep shiny black. Pleura shiny black. Prosternum broad. Halteres dark brownish black. Legs with the coxæ and trochanters black; femora black, the bases of the fore femora dull yellow; tibiæ dark brown, tipped with black; metatarsi dark brown, tipped with black; remainder of the tarsal segments broken. Wings with a deep, dark brown tinge, more suffused in the costal region; veins dark brown. Venation: *Sc* longer than in *D. natalia*, Sc_1 ending about opposite r–m, Sc_2 beyond mid-length of the deflection of R_{4+5}; R_1 beyond r shorter than the deflection of R_{4+5}; *Rs* short, about equal to or shorter than cell 1*st* M_2.

Abdomen black throughout.

Hab. Uganda.

Holotype, ♂, Mabira Forest, Chagwe, altitude 3500–3800 ft., July 16–25, 1911 (*S. A. Neave*). B.M. no. 1913. 140.

Type in the collection of the British Museum (Natural History).

Dicranoptycha atricolor may be confused only with the much smaller *D. natalia*, Alexander (Natal), which is readily told by the paler body-coloration, the yellow trochanters, and the different venational details as outlined above.

Genus RHAMPHIDIA, Meigen.

Rhamphidia iris, sp. n.

Rostrum very long and slender, nearly as long as the head and thorax taken together; head grey; mesonotal præscutum and scutum shiny black, remainder of the thorax orange-yellow; coxæ and trochanters black; wings iridescent, the apex and stigma brown; abdomen black, the last segment (in the female) orange.

Female.—Length (excluding rostrum) about 8 mm.; wing 7 mm.; rostrum 2 mm.

Rostrum very long and moderately slender, nearly as long as the combined head and thorax, dark brown, the short brown palpi at the tip. Antennæ dark brown throughout, the flagellar segments oval. Head dark, heavily light grey-pruinose; eyes large, the vertex between them very narrow.

Cervical sclerites dark brown. Pronotum orange-yellow, the anterior margin a little darkened. Mesonotal præscutum and most of the scutum shiny black, the posterior margins of the scutal lobes, scutellum, and postnotum orange-yellow. Pleura and sternum orange-yellow. Prosternum rather broad and extensive, narrowed anteriorly. Halteres black, only the extreme base of the stem yellowish. Legs with the coxæ and trochanters black, contrasting conspicuously with the light-coloured pleura; remainder of the legs broken. Wings subhyaline, highly iridescent, the costal and subcostal cells a little darker; wing-tip in cells R_1 to M_3 darkened; stigma oval, dark brown; veins dark brownish black. Venation (a single wing preserved in the unique type): Sc ending opposite the end of Rs, Sc_2 at the end of Sc_1; Rs long, almost straight; basal deflection of R_{4+5} about equal to m; cell *1st* M_2 closed; basal deflection of Cu_1 a little beyond mid-length of the cell *1st* M_2.

Abdomen black, the genital segment orange. Ovipositor brown, the tips paler, the tergal valves very long, almost straight, slightly upcurved at the tips.

Hab. Uganda.

Holotype, ♀, "Col. Cole's house, NTB, early morning," November 1904 (*Capt. E. D. W. Greig*). B.M. 1905. 310.

Type in the collection of the British Museum (Natural History).

Rhamphidia cacoxena, sp. n.

Rostrum very long and slender, nearly as long as the head and thorax taken together; head grey; mesonotum black; pleura dark brown, the metapleura more brownish yellow; coxæ and trochanters black; wings iridescent, the apex and stigma brown; abdomen black, the last segment orange.

Female.—Length (excluding rostrum) about 5·5 mm.; wing 5 mm.; rostrum 1·4 mm.

Rostrum very long and moderately slender, nearly as long as the combined head and thorax; palpi dark brown. Antennæ dark brown. Head grey.

Pronotum brown. Mesonotum black. Pleura dark brown, the dorsal pleurites and metapleura obscure brownish yellow. Halteres dark brown, the base of the stem dull yellow. Legs with the coxæ and trochanters dark brown; femora dark brown; remainder of the legs broken. Wings subhyaline, the costal and subcostal cells and the wing-tips darkened; stigma dark brown, large, extending across cell R_1 to vein R_{2+3}; membrane iridescent. Venation as in *R. iris*, but the basal deflection of Cu_1 before the middle of cell 1*st* M_2; cell R_3 at the wing-margin but little wider than cell R_1.

Abdomen black, the genital segment and valves of the ovipositor orange; valves of the ovipositor straight, the tips a little upcurved.

Hab. Southern Nigeria.

Holotype, ♀, Ilesha, August 17, 1910 (*Capt. L. E. H. Humfrey*). "Caught in house."

Presented by the Entomological Research Committee, 1911. 422.

Type in the collection of the British Museum (Natural History).

Rhamphidia cacoxena very closely resembles *R. iris*, of which it appears almost as a miniature; the different coloration of the posterior sclerites of the mesonotum will separate the two species.

Rhamphidia obsoleta, sp. n.

Rostrum very long and slender, nearly as long as the head and thorax taken together; general coloration brown; wings nearly hyaline; stigma pale brown, the wing-tip not darkened.

Female.—Length (excluding rostrum) about 6·3 mm.; wing 5·7 mm.; rostrum 1·8 mm.

Rostrum long and comparatively slender, nearly as long as the combined head and thorax, dark brown; palpi dark brown. Antennæ dark brown. Head dark brown.

Mesonotum brown, the pleura scarcely paler. Halteres brown. Legs slender; coxæ and trochanters dark brown; remainder of the legs dark brown, the terminal tarsal segments a little paler. Wings nearly hyaline; stigma pale brown, not reaching vein R_{2+3}; veins dark brown. Venation: Sc ending just beyond the end of Rs, Sc_2 at the tip of Sc_1; vein R_{2+3} running parallel with R_{4+5}, diverging only at the end of the cell, cell R_3 trumpet-shaped only at its outer end; cell R_3 but little wider at the wing-margin than cell R_1; cell 1*st* M_2 small, hexagonal, the section of M_{1+2} between *r–m* and *m* subequal to the basal section of M_{1+2} and nearly twice as long as *m*; *m* subequal to the outer deflection of M_3; basal deflection of Cu_1 slightly beyond mid-length of cell 1*st* M_2.

Abdomen dark brown; valves of the ovipositor long and straight.

Hab. Sierra Leone.

Holotype, ♀, October 1904 (*Major F. Smith*). B.M. no. 1904. 347.

Type in the collection of the British Museum (Natural History).

In general appearance, *Rhamphidia obsoleta* agrees most closely with *R. cacoxena* (Southern Nigeria), from which it may be told by the darker thoracic pleura, the lack of darkened wing-tips, the smaller and paler stigma, and the different venation, the longer *Rs*, the longer *Sc* which ends beyond the fork of *Rs*, the narrower and straighter cell R_3 which is suddenly dilated at its outer end, the lower cell 1*st* M_2 and the consequent elongation of *r–m*, and other characters.

Rhamphidia morosa, sp. n.

General coloration dark brown; rostrum about twice the length of the head; wings uniformly pale brown, the stigma darker brown; cell R_3 about three times as wide as cell R_1 at the wing-margin; cell 1st M_2 closed, irregularly pentagonal.

Female.—Length (excluding rostrum) 6·6 mm.; wing 7 mm.; rostrum 1·3 mm.; abdomen alone 4·4 mm.

Rostrum about twice the length of the head, dark brown; palpi dark brown. Antennæ and head dark brown.

The thorax is badly injured in pinning and the coloration can be discussed in general terms only. Mesonotum dark brown, pleura a little paler. Halteres dark brown, the base of the stem a little paler. Legs long and slender; coxæ and trochanters dark brown; remainder of the legs dark brown, the femora a little paler basally, the tarsi somewhat paler at the tips. Wings with a uniform pale brown suffusion, the subcostal cell a little darker; stigma elongate-oval, darker brown; veins dark brown. Venation: *Sc* ending just before the fork of *Rs*, Sc_2 at the tip of Sc_1; R_{2+3} running rather close to R_1 before the end of the latter; cell R_3 very wide at the wing-margin, about three times as wide as cell R_1; cell 1st M_2 closed, irregularly pentagonal; M_{1+2} between *r–m* and *m* being a little shorter than the basal deflection of M_{1+2} and but little longer than the gently arcuated *m*; outer deflection of M_3 perpendicular, about two-thirds as long as *m*; basal deflection of Cu_1 immediately before the fork of *M*.

Abdominal tergites dark brown, the sternites brownish yellow. Ovipositor with the valves long and straight, the extreme tips broken in the unique type.

Hab. Sierra Leone.

Holotype, ♀, October 1904 (*Major F. Smith*). B.M. 1904. 347.

Type in the collection of the British Museum (Natural History).

Rhamphidia imperfecta, sp. n.

Rostrum long and slender, about twice the length of the head; general coloration dark brown; legs dark brown, the tarsi paler; wings hyaline, the stigma narrow, pale brown; cell 1st M_2 open, basal deflection of Cu_1 beyond the fork of *M*.

Sex?—Wing 5 mm.; rostrum 1 mm.

The type-specimen has the tip of the abdomen injured, so the sex cannot be determined.

Rostrum moderately elongate, about twice the length of the head, dark brown; palpi dark brown. Antennæ with the scapal segments dark brown, the flagellum broken. Head dark brown, the cheeks with long curved setæ.

Mesonotum dark brown without apparent darker markings, the pleura a little paler. Halteres broken. Legs with the coxæ and trochanters testaceous brown; remainder of the legs dark brown, the tarsi somewhat paler brown. Wings hyaline; stigma narrow, indistinct, pale brown; veins dark brown. Venation: *Sc* ending just before the fork of *Rs*, Sc_2 at the tip of Sc_1; *Rs* long and almost straight; cell 1*st* M_2 open by the atrophy of *m*; basal deflection of Cu_1 inserted a short distance beyond the fork of *M*, the distance between it and the fork of *M* about one-third the fusion of Cu_1 and M_3.

Abdomen dark brownish black, the tip injured.

Hab. Sierra Leone.

Holotype, sex?, Daru (*Dr. Murphy*).

Presented by the Entomological Research Committee, 1913. 394.

Type in the collection of the British Museum (Natural History).

Rhamphidia imperfecta may be told by the open cell 1*st* M_2, a character possessed only by *R. camarounensis*, Alexander, among the known Ethiopian species of the genus. This latter fly is the type of the subgenus *Rhamphidina*, distinguished by the shorter *Sc*, the very divergent veins R_{2+3} and R_{4+5} with the consequent widening of cell R_3, and the location of the basal deflection of Cu_1 before the fork of *M*.

Genus Teucholabis, Osten-Sacken.

Teucholabis rubrithorax, sp. n.

Head black; thorax shiny reddish yellow throughout; wings subhyaline with three narrow brown cross-bands, the last occupying the wing-tip far beyond the outer end of cell 1*st* M_2; abdomen black, the ovipositor reddish horn-colour.

Female.—Length about 7·5 mm.; wing 6·2 mm.

Rostrum slender, nearly as long as the head, dark brown; palpi dark brown. Antennæ dark brownish black, the scapal segments a little paler brown. Head black, the anterior part of the vertex sparsely grey-pubescent.

Neck brown. Pronotum reddish. Mesonotum shiny redddish yellow without distinct darker stripes. Pleura reddish yellow. Halteres dark brown, the knobs light yellow. Legs with the coxæ and trochanters reddish yellow;

fore femora with the basal three-fifths yellow, the slightly incrassated apex black; hind femora with the basal half dull yellow, passing into dark brown; tibiæ dark brown, tipped with black; tarsi black. Wings subhyaline with three narrow brown cross-bands, the first at the level of the origin of the sector, most evident at the origin of the sector and the end of vein *2nd A*, very pale and indistinct in the intervening cells; the second band is located along the cord, broadest at costa, extending to the fork of *Cu* and thence as a much paler cloud to the wing-margin; the third band occupies the wing-apex, the inner margin almost straight, including the extreme tips of cells *2nd* R_1 and M_3, about the outer third of cells R_3, R_5, and *2nd* M_2; veins dark brown, veins *C*, *Sc*, and the wing-base more yellowish. Venation: *Sc* ending beyond mid-length of the long sector, Sc_2 far back from its tip, nearer to the origin of *Rs* than to the tip of Sc_1; cell *1st* M_2 long and narrow, widened distally, a little longer than vein Cu_1 beyond it; basal deflection of Cu_1 near the inner end of cell *1st* M_2.

Abdomen shiny black. Ovipositor reddish horn-colour, the bases of the sternal valves black; tergal valves of the ovipositor long and slender, strongly upcurved, the tips acute.

Hab. Gold Coast.

Holotype, ♀, Aburi, 1912–1913 (*W. H. Patterson*). B.M. no. 398.

Type in the collection of the British Museum (Natural History).

Teucholabis nodipes, Speiser (Cameroun), has the mesothorax largely shiny black and the brown wing-pattern more extensive.

Teucholabis latifascia, sp. n.

Male.—Length about 7 mm.; wing 6·7 mm.

Female.—Length about 7 mm.; wing 6·2 mm.

Very similar to *T. rubrithorax*, differing as follows: The wing-apex and the brown band at the cord are much broader, the apex including about the outer third of cell *2nd* R_1, nearly the outer half of cell R_5, and the outer three-fourths of cell *2nd* M_2; the band at the cord is approximately one-half as wide as the hyaline band between it and the dark apex; the latter is approximately as wide as, or wider than, this hyaline band; the basal band is but little narrower than the band at the cord. Cell *1st* M_2 is longer, slightly exceeding in length that portion of vein Cu_1 beyond it and subequal to vein M_3 beyond it.

Hab. Ashanti.

Holotype, ♂, Obuasi, June 8, 1907 (*Dr. W. M. Graham*). B.M. 1908. 245.

Allotopotype, ♀, July 5, 1907.

Type in the collection of the British Museum (Natural History).

A note by the collector indicates that these specimens were "caught on window."

Tribe ERIOPTERINI.

Genus ERIOPTERA, Meigen.

Erioptera (*Erioptera*) *carissima*, sp. n.

Antennæ pale brownish yellow; head shiny black; mesonotal præscutum obscure yellow with three stripes, the median stripe reddish brown, the lateral stripes blackish; halteres pale yellow at the base, the remainder brownish black; legs light yellow; wings light yellow, with three pale greyish cross-bands, the tip broadly pale; male hypopygium with two pleural appendages, the inner one branched; gonapophyses powerful, directed laterad.

Male.—Length about 5·5 mm.; wing 5·3 mm.

Female.—Length about 5·8 mm.; wing 5·4 mm.

Rostrum and palpi pale brownish yellow. Antennæ in the male sex pale brownish yellow, in the female with the flagellum a shade darker brown than the scape. Head shiny brownish black, eyes of the male very large, broadly contiguous beneath.

Mesonotum highly polished, obscure yellowish, with three broad stripes, the median stripe reddish brown, the lateral stripes almost black; scutum with the lobes shiny brownish black, indistinctly margined with pale; scutellum dull brownish yellow; postnotum with the basal half brown, the posterior half almost black. Pleura with the dorsal sclerites deep chestnut-brown, the ventral sclerites yellowish; a conspicuous china-white area on the mesepisternum, cephalad and ventrad of the wing-root; in the paratype, this area is scarcely evident. Halteres with the basal half of the stem pale yellow, the remainder of the stem and the knobs dark brownish black. Legs with the coxæ and trochanters light yellow; femora clear golden yellow; tibiæ brownish yellow; tarsi pale, the apical segments dark brown. Wings light yellow, including a broad incomplete sub-basal band, a broad band immediately before the cord, and the broad wing-apex, this latter narrowest in the type male; remainder of the wing-surface provided with three broad, pale grey cross-bands, as follows: the first just beyond the arculus, occupying most of the basal half of cell *2nd A*, in cells *R* and *M* narrowly connected with the broad second band which occupies the level of the sector and the end of vein *2nd A*, beginning in cell *Sc*, continued to the posterior margin, the third band lies just beyond the cord, narrowest near the dark brown stigma, continued caudad across the wing, occupying about the basal halves of cells R_2, R_3, R_5, M_2, and M_3, all but the base of cell Cu_1 and the tip of cell *Cu*; veins brown, a little darker in the grey areas. Venation: almost as in the related *E. péringueyi*, but vein Cu_2 is less strongly bent near the tip and vein *2nd A* runs closer to the wing-margin at its bend so that cell *2nd A* is very narrow at this point.

Abdominal tergites obscure yellow, shiny, indistinctly darker medially; sternites rather more uniformly yellowish. Male hypopygium with the pleurites stout, the inner apical angle a little produced and covered with numerous setigerous tubercles; two pleural appendages, the outer one straight, the stem slender, the apex enlarged into a globular head that is covered with parallel rows of overlapping, scale-like structures; the inner appendage is profoundly two-branched, the arms divergent at a straight angle; the short arm is straight, the long arm recurved just beyond the base so the long apex lies subparallel with the short arm; this arm is a little dilated before the acute tip and here provided with numerous short appressed hairs. Gonapophyses flattened, the inner angles produced into powerful blackened horns that are directed strongly laterad and thus divergent. Ninth pleurites dark brown basally, the tips brightened.

Hab. Nyasaland.

Holotype, ♂, Mt. Mlanje, January 18, 1914 (*S. A. Neave*).

Allotopotype, ♀, August 29, 1913.

Paratopotype, sex ?, abdomen broken, September 3, 1913.

Presented by the Imperial Bureau of Entomology, 1914. 431, 1915. 58.

Type in the collection of the British Museum (Natural History).

This beautiful crane-fly is readily told from *E. péringueyi*, Bergroth, the only described species that is close to it, by the well-marked diagnostic characters given above.

Erioptera (*Erioptera*) *carissima nitidiuscula*, subsp. n.

Female.—Length 6·1 mm.; wing 5·5 mm.

Very similar to typical *carissima*, differing as follows: The entire thoracic dorsum and pleura is a deep brownish black, with a light yellow area on the mesepisternum as described under the typical form. The dark wing-pattern is more extensive, all three bands being connected with one another in the cubital cells of the wing, the band beyond the cord suffusing the entire wing-apex, excepting a narrow delicate margin at the extreme tip. Abdomen dark brown, only the bases of the segments indistinctly paler; genital segments and valves of the ovipositor reddish horn-colour, as in the typical form.

Hab. British East Africa.

Holotype, ♀, Mumias District, north and south banks of the Nzoia River, North Kavioronda, September 2, 1911 (*C. W. Woodhouse*); on self.

Presented by the Entomological Research Committee, 1912. 196.

Type in the collection of the British Museum (Natural History).

Erioptera subirrorata, sp. n.

General coloration pale greyish brown, the dorsal pleural sclerites of the thorax rather darker; halteres with the knobs pale; legs with the femora yellowish, the tibiæ more brownish; wings faintly brownish yellow, the outer costal margin more suffused, the veins beyond the cord faintly irrorate with pale brown dots; cell *1st* M_2 closed, *2nd Anal* vein sinuate.

Sex?—Wing 6·3 mm.

Rostrum and the rather large palpi brown. Antennæ with the scapal segments brown, the flagellum broken. Head dull yellow, the vertex whitish-pruinose.

Mesonotum pale greyish brown, the lateral margins of the præscutum paler; tuberculate pits separated by a distance that is about equal to three times the diameter of one, located immediately cephalad of the level of the nearly transverse pseudosutural foveæ. Pleura dull yellow, the dorsal sclerites broadly but somewhat indistinctly infuscated to produce a dorsal stripe. Halteres brown, the knobs large, light brownish yellow. Legs with the coxæ and trochanters light yellow; femora yellow; tibiæ and tarsi brown, the distal segments of the latter darker brown. Wings with a faint brownish-yellow suffusion, the costal margin between the origin of *Rs* and the wing-apex more suffused with brown, the basal half of the costal cell pale; veins beyond the cord in the radial and medial fields with series of small pale brown dots, somewhat after the fashion of *Conosia irrorata*; larger, dark brown spots along the costal margin at Sc_2, Sc_1, R_1, R_2, and R_3. Venation: Sc_2 retreated some distance from the tip of Sc_1, Sc_2 being at about one-third the distance between the origin of *Rs* and the tip of Sc_1; *r* on R_2 at about its own length beyond the fork of R_{2+3}; R_{2+3} about equal to the basal deflection of Cu_1; cell *1st* M_2 closed; *m* transverse; inner end of cell *1st* M_2 narrowed; basal deflection of Cu_1 before the fork of *M*, the distance about equal to *r–m*; *2nd Anal* vein sinuous, as in the subgenus *Erioptera*.

Abdomen broken.

Hab. British East Africa.

Holotype, sex?, Kericho, altitude 5500 feet, November 1, 1912 (*R. B. Woosnam*). B.M. no. 1914. 2.

Type in the collection of the British Museum (Natural History).

The unique type above described is in poor condition, one wing and the abdomen being lost. The well-marked characters diagnosed above will render the species easily recognizable. The type is pinned on the same pin with a paratype of *Limnophila diffusa*.

Erioptera ignava, sp. n.

Head dark grey; mesonotal præscutum yellow with three reddish-brown stripes; scutellum dark brown; postnotum with a median brown line; pleura with a broad dark brown dorsal stripe and a slightly narrower yellow ventral stripe; wings long and narrow, greyish yellow; cell *1st* M_2 closed, vein *2nd A* straight.

Male.—Length 5·8 mm.; wing 5·7 mm.

Female.—Length 6 mm.; wing 6·2 mm.

Rostrum varying from light to dark brown. Antennæ dark brown, the scapal segments slightly paler brown. Head dark grey, the vertex surrounding the eyes pale brownish yellow, in some cases forming a U-shaped mark behind the antennæ with the arms of the U directed backward; posterior region of the vertex with numerous, stiff, subproclinate bristles; eyes small, broadly separated both above and below.

Pronotum moderately prominent, light yellow, the scutellum with a shiny median area; procoxæ large, practically contiguous. Mesonotal præscutum yellow with three reddish-brown stripes, the lateral margins of the sclerite brighter.

scutal lobes reddish brown, scutellum dark brown; postnotum dull yellow, dark brown medially. Pleura with the dorsopleural membranes dull yellow; a broad conspicuous, brown to dark brown dorsal stripe, continued from the prosternum to the base of the abdomen; immediately beneath this stripe is a slightly narrower, light yellow stripe passing immediately above the coxal bases; sides of the mesosternum deep reddish, the median area light yellow, with a deep median impressed line. Halteres dark brown. Legs with the coxæ reddish; trochanters dull yellow; femora dull yellow, the tips indistinctly brownish; tibiæ yellowish brown; tarsi brown. Wings long and narrow, with a strong greyish-yellow tinge, the stigma indistinct; veins brown. Venation: *Sc* long, ending opposite to the fork of *Rs*, Sc_2 some distance from the tip of Sc_1, so that it lies just beyond mid-distance between the origin of *Rs* and the tip of Sc_1; *Rs* long, slightly angulated at origin; R_{2+3} about two-fifths the length of *Rs*, *r* at its fork; cell R_2 very long and narrow; the very short basal deflection of R_{4+5} is almost in direct alignment with both *Rs* and R_{4+5}; *r–m* about twice *r*; cell 1*st* M_2 very long and narrow, widened distally, a little longer than vein Cu_1 beyond it; basal deflection of Cu_1 at the fork of *M*; *2nd Anal* vein almost straight, cell 1*st A* consequently widest at the wing-margin.

Abdomen brownish yellow. Male hypopygium with the pleurites moderately elongated, the inner face concave; two short, shiny black appendages, the dorsal one about twice as large as the ventral. The female has the valves fleshy or at least not strongly chitinized as in most species of the genus; the tip of the abdomen is abruptly narrowed, viewed from beneath with the tip feebly bilobed.

Hab. Cape Colony.

Holotype, ♂, Cape Town, September 7.

Allotopotype, ♀, October 9.

Type in the collection of the British Museum (Natural History).

This fly would seem to be one of the aberrant members of the genus *Erioptera*, though it is possible that more material would necessitate its removal from this group.

Erioptera nigrolatera, sp. n.

Head black, heavily light grey-pruinose; mesonotal præscutum with a broad grey median stripe, the broad lateral stripes sooty black; legs brown clothed with conspicuous erect hairs; wings dusky grey; cell 1*st* M_2 open by the atrophy of *m*, Anal veins divergent; abdomen brownish black; gonapophyses of the male hypopygium shaped like a furcula, the arms expanded into blades at their tips.

Male.—Length 4–4·6 mm.; wing 5–5·3 mm.

Rostrum and palpi dark brown. Antennæ black, the distal flagellar segments more brownish; second scapal segment oval, tumid; two basal flagellar segments similar, but much smaller; remaining flagellar segments somewhat elongated, enlarged at mid-length and here with moderately long verticils. Head black, heavily light grey-pruinose.

Pronotum dark brown. Mesonotal præscutum with the lateral margins narrowly but conspicuously light yellow; disk pale grey with a broad, darker grey, median stripe and broad, sooty-black, lateral stripes; remainder of the mesonotum dark, sparsely pruinose. Pleura brown, sparsely pruinose, the dorso-pleural membrane dull yellow. Halteres brown. Legs with the coxæ dark brown, pruinose; trochanters yellowish brown; femora pale brown with rather sparse, but conspicuous, long erect hairs; remainder of the legs darker brown, the erect hairs a little less conspicuous. Wings with a dusky grey tinge; veins dark brownish black. Venation: Sc long, Sc_1 ending beyond the fork of R_{2+3}, Sc_2 retreated some distance from the tip of Sc_1, lying immediately before the end of Rs; Rs long and straight; R_{2+3} straight, a liitle shorter than the basal deflection of Cu_1; r very faint, located on R_2 at a distance from the fork of R_{2+3} that is about equal to this latter vein; R_2 slightly arcuated at its origin, so cell R_2 is wide at its base; veins R_3 and R_{4+5} almost parallel, M_{1+2} slightly upcurved at its tip; cell 1st M_2 opened by the atrophy of m; basal deflection of Cu_1 at about mid-length of vein M_3; Anal veins divergent.

Abdomen dark brownish black, the appendages of the hypopygium horn-coloured. Male hypopygium with the tergal plate rather large, the caudal margin nearly circularly concave, the lateral angles produced into slender cylindrical horns that are directed caudad and slightly proximad; pleurites long, somewhat compressed, relatively slender, with but a single apparent appendage; this is relatively small, gradually narrowed to the acute bristle-like tip, the face provided with numerous setigerous punctures; just beyond mid-length of the appendage a slender, cylindrical, thumb-like appendage. Gonapophyses very conspicuous, appearing as a furcula on the ventral face of the genital chamber; each arm is a prominent flattened blade, shaped somewhat like a leg and foot, the toe produced into a long curved point that is decussate with its mate of the opposite side; at the base of the fork on the ventral face a slender, straight, chitinized rod that bears a short lateral spine on its dorsal face.

Hab. Nyasaland.

Holotype, ♂, Mlanje, January, February, 1914 (*Dr. J. B. Davey*).

Paratopotype, ♂.

Presented by the Imperial Bureau of Entomology, 1914. 303, 1915. 58.

Type in the collection of the British Museum (Natural History).

This species needs no comparison with any of the known species of the genus. Together with the last-described species, *E. ignava*, the present form must be considered an aberrant member of the genus *Erioptera*, and yet there are no sufficient tangible characters on which to remove either from this large and somewhat heterogeneous group.

Genus GNOPHOMYIA, Osten-Sacken.

Gnophomyia peramœna, sp. n.

Head, thoracic pleura, and segments seven to nine of the abdomen black; mesonotum, halteres, and base of the abdomen orange; legs black, the bases of the femora yellow; wings dark brown with a broad white band before the cord that does not attain the costal, subcostal, or anal cells; distal cells of the wing pubescent.

Male.—Length about 7 mm.; wing 7·2 mm.

Female.—Length about 9 5 mm.; wing 8·2 mm.

Rostrum and palpi dark brown. Antennæ dark brownish black, the basal flagellar segments rather elongate, a little produced distally on the inner face, outer flagellar segments more oval. Head shiny black.

Pronotal scutum deep black. Mesonotum and dorsopleural membranes orange. Tuberculate pits a little anterior to the level of the pseudosutural foveæ. Pleura deep black. Halteres orange. Legs with the coxæ and trochanters black; femora black with the bases yellow, narrowest on the fore femora where it occupies a little more than one-third of the segment, broadest on the hind legs where it includes about three-fifths of the segment; tibiæ and tarsi black. Wings dark brown, variegated with white; a broad white band before the cord, extending from vein *R* into cell *Cu*$_1$, very distinct in cells *2nd R*$_1$, *R*, and *M*; an oval white spot in cell *R* before the origin of *Rs*; a less distinct pale area in the base of cell *1st A*, lacking in the type-female; base of the wing before the arculus orange-yellow; veins dark brown. Cells of the wing beyond the cord with strong macrotrichia; in the centre of cell *Cu* these macrotrichia continue basad almost to the level of the origin of *Rs*. Venation: Sc_1 ending about opposite *r*, Sc_2 far from the tip of Sc_1, located near the inner margin of the white band; *r* on R_2 just beyond its origin; cell *1st* M_3 moderately broad, the basal deflection of Cu_1 inserted at from one-third to one-fourth its length.

Abdomen with the six basal segments orange, the remainder of the abdomen deep black.

Hab. Nyasaland.

Holotype, ♂, Mt. Mlanje, January 4, 1913 (*S. A. Neave*). Presented by the Entomological Research Committee, 1913. 236.

Allotopotype, ♀, January 23, 1913. Presented by the Imperial Bureau of Entomology, 1915. 58.

Type in the collection of the British Museum (Natural History).

This exquisite fly is readily told from *G. elegans* (Wiedemann) by the apically pubescent wings and the very different coloration of the body and wings.

Gnophomyia perelegans, sp. n.

Head black, light grey-pruinose; thorax and abdomen metallic greenish blue; halteres brownish black, the knobs conspicuously pale yellow; legs black; wings dark brownish black with two broad whitish transverse bands; distal cells of the wing pubescent.

Female.—Length about 9·5 mm.; wing 8·6 mm.

Rostrum and palpi dark brownish black. Antennæ black, somewhat longer than in the corresponding sex of *G. peramœna*. Head broad, black, light grey-pruinose.

Entire thorax metallic greenish blue, the postnotum and pleura sparsely grey-pruinose. Halteres dark brownish black, the knobs conspicuously pale yellow. Legs with the coxæ blue-black, sparsely pruinose; remainder of the legs black. Wings dark brownish black, with two large whitish cross-bands, the first lying just before the level of the origin of *Rs*, extending from vein *R* through cells *R*, *M*, *Cu*, across the base of *1st A* into cell *2nd A*, but not reaching the wing-margin; the second band is larger, lying just before the cord, extending across cells *1st* R_1, *R*, *M*, and *Cu*, narrowly interrupted along vein *Cu* in the latter cell; veins brownish black. Macrotrichia almost as in *G. peramœna*, but traversing the outer white band in cell *Cu*. Venation: *Sc* slightly shorter than in *G. peramœna*, Sc_1 ending just before the fork of R_{2+3};

r on R_2 a little less than its own length beyond the fork of R_{2+3}; basal deflection of Cu_1 inserted a short distance before mid-length of the small, nearly pentagonal, cell 1*st* M_2.

Abdomen metallic greenish blue. Valves of the ovipositor black, a little paler at the extreme tips.

Hab. Nyasaland.

Holotype, ♀, Mt. Mlanje, December 28, 1912 (*S. A. Neave*).

Presented by the Imperial Bureau of Entomology, 1915. 58.

Type in the collection of the British Museum (Natural History).

Gnophomyia perelegans is very closely allied to *G. peramœna*, despite the striking differences in the coloration of the body and legs. In both species the hind legs are conspicuously longer than the others and the femora are slightly incrassated.

Genus Gonomyia, Meigen.

Gonomyia (Gonomyia) nyasæ, sp. n.

Antennæ black, the scapal segments paler; mesonotum pale brown, the scutellum broadly margined with white; pleura striped longitudinally brown and white; halteres yellow, the base of the knobs brown; legs pale brown; wings faintly greyish, stigma indistinct; cell R_2 very small, basal deflection of Cu_1 before the fork of *M*; abdominal tergites uniformly dark brown; male hypopygium with both pleural appendages simple.

Male.—Length 3·4 mm.; wing 3·6 mm.

Rostrum dark brown; palpi black. Antennæ with the enlarged scapal segments pale yellowish brown; flagellum black with exceedingly elongate verticils. Head badly wrinkled in the unique type, pale brownish yellow, the vertex indistinctly darker medially.

Mesonotal præscutum pale brown, the extreme lateral margins yellowish white; scutum similar; scutellum pale brown, the caudal margins broadly white; postnotum dark brown, the sides more yellowish. Pleura dark brown, longitudinally striped with whitish, the dorsal stripe formed by the lateral margins of the mesonotal præscutum as described above, the ventral stripe lying across the base of the mesosternum. Halteres pale yellow, the knobs brown with only the tips yellow. Legs with the coxæ and trochanters pale brown; remainder of the legs pale brown, the distal tarsal segments dark brown; a few stiff setæ at the tips of the femora. Wings with a faint grey tinge; stigma indistinct; veins pale brown. Venation: *Sc* short, Sc_1 ending a short distance before the origin of *Rs*; vein R_{2+3} in alignment with *Rs* and much longer than it; cell R_2 very tiny, vein R_2 being less than one-half of *r–m*; inner ends of cells R_3, R_5, and 1*st* M_2 in alignment; basal deflection of Cu_1 just before the fork of *M*, the fusion about equal to R_2.

Abdominal tergites dark brown, the sternite more yellowish brown. Male hypopygium with two pleural appendages, the outer appendage slender, much longer than the inner appendage, the tip broken in the unique type. Inner pleural appendage rather small, broad at the base, rapidly narrowed to the subacute, heavily blackened tip, the face with numerous setigerous punctures that bear stout setæ. Gonapophyses and penis-guard forming a large, pale, central organ of which the only heavily chitinized elements appear as two divergent, laterally directed horns.

Hab. Nyasaland.

Holotype, ♂, Mt. Mlanje, November 8, 1913 (*S. A. Neave*). B.M. no. 1914. 498.

Type in the collection of the British Museum (Natural History).

Gonomyia nyasæ is very similar to *G. sulphurelloides*, Alexander (Natal to Nyasaland), from which it is readily told by the very different male hypopygium, in *G. sulphurelloides* the inner pleural appendage terminating in three points instead of being simple as in the present species.

Gonomyia (*Gonomyia*) *noctabunda*, sp. n.

Antennæ dark brown, the scape paler; pleura dark brown with a narrow, white, longitudinal stripe; femora yellowish brown with a narrow brown ring before the tips; wings nearly hyaline; veins dark brown, *C*, *Sc*, and *R* more yellowish; abdomen blackish, the segments narrowly margined caudally and laterally with pale yellowish white.

Male.—Length 2·8–3 mm.; wing 3·3 mm.

Female.—Length 3·8–4 mm.; wing 3·5–4 mm.

Rostrum and palpi dark brown. Antennæ dark brown, the scapal segments a little paler, slightly enlarged. Head light orange-brown.

Mesonotal præscutum light brown, the lateral margins narrowly pale yellowish; remainder of mesonotum pale brown, light grey-pruinose, the scutellum margined caudally with pale whitish. Pleura dark brown with a conspicuous, narrow, white, longitudinal stripe; mesosternum dark brown. Halteres yellow, the knobs dark brown. Legs with the coxæ yellow, the basal half of the outer face brown; trochanters dull yellow; femora pale yellowish brown with a narrow dark brown ring just before the tip; tibiæ pale brown, the tips dark brown; tarsi dark brown. Wings nearly hyaline, the veins dark brown, conspicuous; *C*, *Sc*, and *R* more yellowish; stigma indistinct. Venation: *Sc* ending before the origin of *Rs*, Sc_2 narrowly seamed with brown, removed a short distance from the tip of Sc_1, the distance between the tip of Sc_1 and the origin of *Rs* about equal to one-half the latter; *Rs* stongly angulated at origin, shorter than R_{2+3}; cell R_2 moderately large for a member of this group, vein R_2 slightly oblique; cell *1st* M_2 usually closed, rarely open by the atrophy of the outer deflection of M_3; basal deflection of Cu_1 before the fork of *M*, the fusion of these two veins about to *r–m* or a little shorter. In the paratype, *Rs* is square at its origin and strongly spurred and Sc_1 ends almost opposite this origin; in all other characters the two specimens agree sufficiently well and until male specimens are found the insects cannot be further separated.

Abdomen blackish, the segments narrowly margined caudally and laterally with pale yellowish white, more distinctly on the tergites; genital segment of the female orange-yellow; ovipositor with the valves horn-coloured, acute. Male hypopygium with the pleurites moderately slender, bearing two pleural appendages of very unequal length; outer appendage unarmed, long and slender, of nearly uniform width beyond the base, the apex obtuse, the basal third pale, the apex blackened; inner pleural appendage small, suboval, the apex with numerous setigerous tubercles. Gonapophyses long and slender, tapering gradually to the acute blackened tips; just before the apex with a broad setigerous area. Penis-guard pale, broad basally, narrowed to the decurved tip.

Hab. Transvaal to British East Africa.

Holotype, ♂, "Lot 30, De Kaap Block B," near Kaapmuiden, Eastern Transvaal, October 11, 1919 (*H. K. Munro*).

Allotype, ♀, Parklands at Nairobi, British East Africa, April 26, 1911 (*J. G. Anderson*). Presented by the Entomological Research Committee, 1913. 394.

Paratopotype, a broken ♂, October 10, 1919; paratype, ♀, Camp, Upper Shire, Nyasaland, September 28, 1911 (*Dr. J. B. Davey*); in dining hut, at night. Paratype presented by the Imperial Bureau of Entomology, 1915. 58.

Type in the collection of the writer; allotype in the collection of the British Museum (Natural History).

Gonomyia (*Gonomyia*) *sobrina*, sp. n.

General coloration dark brown; thoracic pleura dark brown with a narrow, whitish, longitudinal stripe; coxæ and trochanters light yellow; wings pale greyish; sparsely spotted with brown, the costa variegated with brown and yellow; abdominal tergites black, narrowly ringed caudally with white.

Female.—Length 4·4 mm.; wing 4·4 mm.

Rostrum and palpi dark brown. Antennæ dark brown, the scapal segments and first flagellar segment a little paler; flagellar verticils not greatly elongated (in the female). Head pale yellowish, the centre of the vertex brown.

Mesonotum dark brown, the anterior margin of the præscutum a little paler; scutal lobes adjoining the wing-roots pale; posterior half of the scutellum pale. Pleura dark brown with a narrow, white, longitudinal stripe extending backward from the fore coxæ. Mesosternum dark brown. Halteres yellow, the knobs brown. Legs with the coxæ and trochanters light yellow, contrasting with the dark colour of the body; remainder of the legs broken. Wings with a smoky tinge, sparsely marked with darker as follows: a spot at arculus; a spot at the origin of *Rs*; stigma rectangular, continued backward as a narrow seam along the cord; outer end of cell 1*st* M_2 seamed with pale brown; a brown seam on R_2; a spot at the tip of R_3; the basal cells of the wing immediately beyond the arculus, cell R_1 before and beyond the stigma, cell R_2 and the tips of cells R_3, R_5, M_1, and 2*nd* M_2 paler than the rest of the wing; veins dark brown; costa dull whitish, variegated with brown at *Rs*, stigma, and tips of veins R_2 and R_3. Venation: *Sc* moderately elongated, Sc_1 ending about opposite the origin of *Rs*; *Rs* and R_{2+3} nearly equal; R_2 short, straight, almost perpendicular to the end of vein R_{2+3}; cells R_3 and R_5 with their inner ends in oblique alignment; cell 1st M_2 closed; basal deflection of Cu_1 a short distance before the fork of *M*—this distance less than one-half of R_2.

Abdomen black, the tergites narrowly ringed caudally with whitish; sternites similar, but the pale caudal margins less distinct. Valves of the ovipositor acute, the tergal valves much longer than the sternal valves, their tips gently upcurved.

Hab. Northern Nigeria.

Holotype, ♀, Ilorin, July 16, 1912 (*Dr. J. W. Scott-Macfie*).

Presented by the Imperial Bureau of Entomology, 1915. 58.

Type in the collection of the British Museum (Natural History).

Gonomyia (*Gonomyia*) *venustipes*, sp. n.

Antennæ yellow; mesonotal præscutum whitish, rich cinnamon-brown sublaterally, the white lateral triangles delimited by dark brown; scutellum white, the caudal margin narrowly dark brown; legs spotted with black and yellow; wings pale yellowish subhyaline, with small dark brown dots and spots; *Sc* long, cell *1st* M_2 very long and narrow.

Female.—Length 4·1 mm.; wing 4·5 mm.

Rostrum and palpi brown. Antennæ with the first segment pale brown, the remaider of the antennæ very pale yellow. Head pale brown, sparsely grey-pruinose.

Pronotum large and conspicuous, pale whitish. Mesonotal præscutum with the broad central area whitish, this median stripe narrowed before the suture to assume the form of an hour-glass, at its narrowest point connected across by a delicate brown line; sublateral regions cinnamon-brown; the triangular lateral regions are conspicuously white, narrowly margined with dark brown, the anterior margin, at the pseudosutural foveæ, very distinct; scutum whitish, only the margins of the lobes more infuscated; scutellum white with two basal spots and the caudal margin narrowly dark brown; postnotum pale brownish yellow, brown laterally and less distinctly in the middle. The pattern of the pleura is not clearly evident in the two specimens at hand, as the pins penetrate this region and are badly verdigrised; the region is pale with a large pale brown area beneath the wing-root and possibly a dark ventral stripe; at least the mesopleura is heavily white-pruinose. Halteres pale, the knobs but little darker. Legs with the coxæ and trochanters pale; remainder of the legs broken (see footnote). Wings pale yellowish subhyline with numerous small brown spots and dots, arranged as follows: the largest at the arculus, smaller ones at the origin of *Rs* and Sc_2; at the tip of Sc_1; at the tip of R_1; seams along the cord, outer end of cell *1st* M_2, and vein R_2; distinct spots at the tips of all the longitudinal veins, largest at *2nd A*; veins pale, brown in the darkened areas. Venation: *Sc* long, Sc_1 extending to about one-half the length of *Rs*, Sc_2 a little beyond the origin of *Rs*; R_1 ending opposite the fork of *Rs*, R_{2+3} about two-thirds as long as *Rs*; R_2 perpendicular to the end of R_{2+3}; vein R_3 about equal to R_{2+3}; inner end of cell *1st* M_2 far proximad of the inner ends of cells R_3 and R_5; cell *1st* M_2 long and narrow, longer than any of the veins issuing from it; basal deflection of Cu_1 at from one-fourth to one-fifth the length of this long cell *1st* M_2. In one specimen *Rs* is slightly spurred at its origin.

Abdomen varying from pale yellowish to dark brown, the genital segment orange-brown. Ovipositor with the valves powerful, long, and slender, the tergal valves strongly upcurved.

Hab. Sierra Leone.

Holotype, ♀, Kamba, November 16, 1913, 8 P.M. (*Dr. J. Y. Wood*).

Paratopotype, ♀.

Presented by the Imperial Bureau of Entomology, 1915. 58.

Type in the collection of the British Museum (Natural History).

The following note by Mr. Edwards accompanies the specimens: "When these specimens were first shown me they had legs beautifully spotted with black and yellow; these were broken off and lost by the attendant who mounted them."

It is very possible that this curious fly is not a true member of the genus, but as it is here that it will run by the keys it is retained in this genus until further material is available. Certain features of the head and thorax suggest the isolated genus *Styringomyia*.

Genus TRENTEPOHLIA, Bigot.

Subgenus MONGOMA, Westwood.

Trentepohlia (*Mongoma*) *madagascariensis*, sp. n.

General coloration dark brown; mesonotal præscutum dull yellow with three dark brown stripes; legs brown, the tips of the femora and tibiæ narrowly creamy white; wings pale brownish, heavily marked with dark brown; basal abdominal segments annulated brown and yellow.

Male.—Length about 12 mm.; wing 10·5 mm.

Rostrum and palpi brownish yellow. Antennæ rather elongate, dark brown throughout, the last segment about twice the length of the penultimate. Head dark brown.

Mesonotal præscutum dull yellow, clearest laterally, with three dark brown stripes, the median stripe ending before the suture; scutum yellow, the lobes dark brown; scutellum and postnotum dark brown. Pleura dark brown. Halteres pale yellow, the knobs dark brown. Legs with the coxæ shiny dark brown; trochanters dull yellow; femora light brown, palest basally, passing into dark brown before the narrow (1·3 mm.) creamy-white tips; tibiæ dark brown with only the extreme bases and the moderately broad tips (2 mm.) pale; tarsi pale brown; fore femora with a row of small erect hairs on the inner face, two of these being more powerful than the others; on the posterior femora there are six or seven such spinous bristles; metatarsi with a few long hairs near the base. Wings with a pale brown suffusion, heavily marked with dark blotches; costal and subcostal cells more yellowish; the brown markings are arranged as follows: at the origin and fork of Rs; at the tip of R_1 and along r; at the origin and tip of R_2; along the cord and outer end of cell *1st* M_2; the cells in the radial field are paler, the wing-apex a little darker; veins dark brown, C, Sc, and R paler. Venation: r oblique, inserted on R_{2+3} about two-thirds of its length before the fork of the latter; R_2 about one-half longer than r; cell *1st* M_2 is apparently open by the atrophy of m; cell R_5 about as long as its petiole; M_3 strongly arcuated or angulated at the point of its departure from Cu_1, cell M_3 being much longer than its petiole; Cu_1 fused with M slightly before the fork of the latter; apical fusion of Cu_2 and *1st* A very slight.

First abdominal tergite dull yellow; remaining segments dark brown, the posterior margins of the basal three or four segments conspicuously dull yellow.

Hab. Madagascar.

Holotype, ♂, Tamatave, 1906 (*A. Sauzier*). B.M. 1906. 291.

Type in the collection of the British Museum (Natural History).

Trentepohlia madagascariensis is readily told from all other regional species of the subgenus by the heavily spotted wings.

Trentepohlia (*Mongoma*) *metatarsatra*, sp. n.

General coloration pale yellow; mesonotal præscutum without stripes; femora pale brown, the tips narrowly white; tibiæ white with a moderately broad brown ring beyond the base; metatarsi black, the remainder of the tarsi pale brown; wings pale greyish yellow; veins pale brown.

Sex?—Wing 7·8 mm.

The unique type is unfortunately in very poor condition, yet the well-marked diagnostic characters are entirely sufficient to enable the species to be recognized. The head and most of the abdomen are lacking.

Mesothorax shiny light reddish yellow without darker markings; scutellum and postnotum but slightly darker. Pleura light yellow. Halteres pale throughout. Of the legs, only a single one of the anterior pair remains, the coxæ and trochanters are light yellow, the distal margin of the latter blackened and produced into an acute tooth; femora very pale brown, passing into white (about 1·5 mm.) at the tips; tibiæ with the extreme base (about 1 mm.) pale, followed by an indistinct brown ring (about 4·5 mm.), the tips broadly white (about 7·3 mm.); metatarsi black, paling into brown at the tips; remainder of the tarsi pale brown; fore femora with two or three scattered erect bristles; on the distal half of the femora pairs of small erect bristles, including two at the tip on the outer face. Wings with a pale greyish-yellow tinge; stigma pale yellow; veins pale brownish yellow. Venation: *r* inserted on R_{2+3} about one-third its own length before the fork of the latter; cell 1*st* M_2 closed, *m* inserted between M_{1+2} and M_3.

Abdomen pale brownish yellow (terminal segments broken).

Hab. Southern Nigeria.

Holotype, sex ?, Oshogbo (*Dr. T. F. G. Mayer*).

Presented by the Entomological Research Committee, 1911. 422.

Type in the collection of the British Museum (Natural History).

Trentepohlia (*Mongoma*) *albilatissima*, sp. n.

Sex ?—Wing 10 mm.

Closest to *T. albilata*, Alexander (Cameroun), differing as follows: mouth-parts, excepting the distal palpal segments, light yellow. Antennæ with the two basal segments light yellow, the first flagellar segment dark brown; remainder of the antennæ broken. Head light fawn-brown.

Mesonotal præscutum shiny reddish, without stripes. Pleura shiny reddish yellow. Legs with the tibiæ largely white, the brown postbasal band (2·5 mm.) a little shorter than the pale base (3·1 mm.), the latter somewhat more extensive than the pale femoral tip (2 mm.); the tibial tips very broadly (10·8 mm.) white, this occupying nearly the distal two-thirds of the tibia; tarsi white; the hind legs are quite similar, but the white apices are even broader (13 mm.), the entire tibia measuring 18·6 mm. Wings greyish subhyaline, the tips indistinctly darkened. Venation: *r* inserted on R_{2+3} nearly its own length before the fork of the latter; *m* at the fork of R_{4+5} and M_{1+2}; basal deflection of Cu_1 just befork the fork of *M*.

Abdomen broken.

Hab. Gold Coast.

Holotype, sex ?, Aburi, 1912–1913 (*W. H. Patterson*).

Type in the collection of the British Museum (Natural History).

The very narrow brown tibial ring will readily distinguish this fly from its near relative, *T.* (*M.*) *albilata*.

Subgenus PARAMONGOMA, Brunetti.

Trentepohlia (Paramongoma) nigeriensis, sp. n.

General coloration uniform pale brown, the pleura more yellowish; legs pale brown, the distal tarsal segments whitish; wings pale greyish subhyaline; *r* far before the fork of R_{2+3}.

Female.—Length about 4·5 mm.; wing 4·4 mm.

Rostrum and palpi dark brown. Antennæ dark brown. Head brown.

Mesonotum uniformly pale brown, the pleura more yellowish. Halteres brown. Legs with the coxæ and trochanters brownish yellow; remainder of the legs pale brown, on the distal tarsal segments passing into dull whitish. Wings pale greyish subhyaline; veins brown. Venation: *Sc* moderately long, the space on costa between Sc_1 and R_1 a little more than half the length of *r*; *r* on R_{2+3} about two-thirds its length before the fork of the latter; R_2 a little longer than *r*; cell 1*st* M_2 closed; basal deflection of Cu_1 before the fork of *M*, the fusion of Cu_1 and *M* about equal to *m*; cell *Cu* widely open, the space along the wing-margin about equal to vein Cu_2 alone.

Abdomen dark brown, the genital segment and valves of the ovipositor more yellowish, the tergal valves very strongly upcurved.

Hab. Southern Nigeria.

Holotype, ♀, Akassa, May 5, 1910 (*Dr. J. J. Simpson*).

Presented by the Entomological Research Committee, 1910. 222.

Type in the collection of the British Museum (Natural History).

This new species may be told from the related *T. ramisiana*, Riedel (British East Africa), by the position of the radial cross-vein and other venational details.

Subgenus TRENTEPOHLIA, Bigot.

Trentepohlia (Trentepohlia) inflata, sp. n.

Antennal scape dark brown, the flagellum pale brownish yellow; mesonotal præscutum reddish brown with three darker brown stripes; wings comparatively narrow, with the costal margin near the origin of *Rs* conspicuously dilated; cell R_2 small, nearly triangular; brown wing-pattern extensive.

Female.—Length about 4·8 mm.; wing 4·3 mm.

Rostrum and palpi dark brown. Antennal scape dark brown, the flagellum pale brownish yellow, the distal segments a little darker. Head dark brown.

Pronotum dark brown. Mesonotal præscutum reddish brown, darker medially and with three darker brown stripes; scutum with the lobes dark brown, the median area paler; scutellum projecting, dark brown; postnotum dark. Pleura indistinctly striped longitudinally with whitish on a dark brown background, the pale stripe lying just above the bases of the coxæ. Halteres brown, the knobs dark brown. Legs with the coxæ larger than is usual in this genus, dark brown, the tips paler; trochanters dark brown; remainder of the legs broken. Wings rather long and narrow, the costal region just beyond the origin of Rs curiously dilated, this enlargement ending opposite Sc_1; wings pale, subhyaline, the wing-base infuscated, continued as a cloud along vein Cu to its fork; a very large brown area occupies the region of the costal dilation, including almost all of cell *1st* R_1, excepting only a small rounded hyaline spot beneath Sc_1 and the extreme tip of the cell; this band also traverses cell R to vein M and continues along the cord to the wing-margin, connected broadly across vein R_{4+5} plus M_{1+2} with the outer blotch which appears as a broad seam along vein R_2 that is continued across cell R_3 and the fork of R_{4+5} plus M_{1+2}; the outer end of cell R_2 and vein R_3 are narrowly seamed with brown; veins yellow, dark brown in the darkened areas. Venation: r is almost in alignment with R_1 and the outer section of R_{2+3}, this latter being very long, about twice as long as R_2 or the basal section of R_{2+3}; R_2 is almost straight and subperpendicular to the end of R_{2+3}, giving to cell R_2 a triangular appearance.

Abdomen dark brown, the basal segments, especially the sternites, indistinctly ringed with obscure yellow, this colour embracing both the basal and caudal margins of the segments. Ovipositor normal for this subgenus, the valves reddish horn-coloured.

Hab. Southern Nigeria.

Holotype, ♀, Yaba, Lagos, April 8, 1910 (*Dr. J. J. Simpson*). Presented by the Entomological Research Committee, 1910. 222.

Type in the collection of the British Museum (Natural History).

This very small *Trentepohlia* is remarkable in the costal dilation of the wings. It will be interesting to learn to what extent this character is developed in the male.

[To be continued.]

II.—*Some new Species of Cyprinoid Fish from Mysore.*

By C. R. NARAYAN RAO, M.A., University of Mysore, Bangalore.

[Plates I. & II.]

THE material described in this paper was collected from the Cauvery in Seringapatam, the Thunga in Shimoga, and from the local tanks, chiefly during the summer recess of 1917–18. In the course of a visit paid to the northern and south-western parts of Coorg in the colder months of the latter year, a very large number of examples was procured from several interesting sources. Through the courtesy of Dr. N. Annandale, to whom my thanks are due, I was enabled to examine the collections, at present available, of *Garra*, *Botia*, and *Nemachilichthys* belonging to the Zoological Survey of India in the Indian Museum. To that distinguished ichthyologist, Dr. B. L. Chaudhuri, I am deeply indebted for the numerous acts of help, which I have received from him.

Before proceeding to describe my examples, which belong to the three genera *Garra*, *Botia*, and *Nemachilichthys*, I propose to add a brief discussion regarding the use of the term *Garra* in preference to *Discognathus*. In his preliminary publication on 'The Genera of Fishes' *, Jordan proposes the revival of the old (generic) name of *Garra* †, originally applied by Hamilton Buchanan to that group of Cyprinine Fishes still included by some authors under Häckle's denomination of *Discognathus*. On resumption of its labours, the International Congress of Zoology is bound to discuss the whole question of ichthyological taxonomy, and it is more than probable that Jordan's recommendations, which are based on recent use by numerous writers, will be upheld. In view of the vicissitudes to which the generic and specific terms are frequently subjected by systematic writers, it is very desirable that some sort of stability be secured for the zoological nomenclature, as otherwise there is bound to be a great deal of confusion to the future investigators. There can be little doubt that Hamilton Buchanan employed the term *Cyprinus* ‡ in a broad sense comprising a very large number of fish, though with very little generic affinity; and obviously, in any modern systematic work on Fishes, his term *Cyprinus* would correspond in regard to inter-relationships to the subfamily Cyprininæ[*] (family Cyprinidæ). It is also evident that this must have been his meaning, for he employs "Divisions" within his "genus" *Cyprinus*, and these "Divisions," though not strictly defined, yet bring together forms of fish which are nearly allied to each other and whose common characteristics undoubtedly constitute the basis of the "Divisions." The common name given by Buchanan to each of these "Divisions" is founded on some vernacular appellations; and the conclusion cannot be resisted that Buchanan's "Divisions" therefore correspond to the "genera" of modern systematic ichthyologists.

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* 1917. Jordan, 'The Genera of Fishes' (Stanford University, California), p. 115.

† 1822. Hamilton Buchanan, Fish. Ganges, pp. 313, 393.

‡ 1822. *Id. op. cit.* p. 256.

Accordingly, "*Cyprinus garra*"[†] is only used by its author as a generic designation for *Garra* itself, which includes a number of stone carps. This position is perfectly tenable, and the species *Cyprinus lamta* (*Discognathus lamta*), which Buchanan describes as a *Cyprinus* of the *Garra* kind with four tendrils, should be obviously written *Garra lamta*, H. B.[‡]. Günther[§] regards this term as "an odd compound" without any claim to anything like an artificial or natural genus, and he is opposed to Bleeker's[||] adoption of what he calls a barbarous denomination (*Garra*) in preference to the more classical term *Discognathus*. Now, it was inevitable that, with the literature available to Buchanan[¶], and having to deal with a quantity of material under the circumstances in which he worked, he should have proposed a scheme of classification which rather appears, to later investigators more fortunately placed, to suffer from certain defects of terminology. Neither this fact nor the other one—viz., that *Garra* is not a latinised term—will deprive Buchanan of the authorship of a valid genus capable of being used for all scientific taxonomic purposes. Besides Bleeker, who, in following Buchanan, employed *Garra* as a generic term for the description of a stone carp from Ceylon[**] (*Garra ceylonensis*, Blkr.), Day also adopted it far more widely for a similar purpose in dealing with fish of the *Garra* kind mainly from the Malabar area of the Peninsular India. *Garra malabarica* [*], Day, *Garra alta* [†], Day, and *Garra jerdoni* [‡], Day, are some of his examples. Bleeker and Day are not, however, the only authors who recognised the genus *Garra*, for Steindachner [§] among the Germans had also employed it, regarding *lamta* as its type-species. Another species of *Garra*, also referred to by this author, is *Garra gotyla*, Gray [‖]. Among the more recent writers on the subject, we find Fowler (*G. borneensis*) [¶] and Berg (*G. persica*) [**] recognising the valid term *Garra* of Buchanan, though there are a few who still try to revive the obsolete name of *Discognathus* [††]. *Platycara* [‡‡], *Gonorhynchus* [§§], and *Mayoa* [‖‖] have been also employed as generic terms by certain systematists, and some, at any rate, are now treated practically as synonymous with *Discognathus*. McClelland simply regarded that his *Platycara* is synonymous with Gray's *Balitora* [¶¶]. The eligibility of the generic term *Gonorhynchus*, which was introduced by Scopoli into the Linnean nomenclature, is, however, disputed as not conforming to the Linnean Code, since no type was indicated by Scopoli while introducing the generic title into the binomial terminology. Still Jerdon freely used this generic term in his description of certain Cyprinine fish from S. India, such as *Gonorhynchus mcClellandi*, Jer., *Gon. gotyla*, Jer., and *Gon. stenorhynchus*, Jer. [***]. Of the three generic terms *Gonorhynchus* (1763), *Garra* (1822), and *Platycara* (1838), Günther (1868) rejects the first and treats the latter two denominations as synonymous with *Discognathus* (1843). *Mayoa* (1869), being of later date, is not referred to by him. As Dr. Annandale informs me, it is possible that on the basis of anatomical characters two distinct genera may have ultimately to be recognised, and in that case the more appropriate generic name will be *Garra* for the species occurring in Baluchistan, India, Burma, Malayan Peninsula, and perhaps Borneo, while *Discognathus*, if it is established to be generically distinct from *Garra*, may be confined to species met with in N.E. Africa, Arabia, Asia Minor, and Persia. In settling all questions relating to terminology, the law of priority has been relied upon usually as a safe guiding principle, and, if any valid generic term conforms to the Linnean Code, there is no sufficient reason why it should be suppressed or the law of priority itself ignored. If the matter of acceptance or rejection of any term should, however, become purely arbitrary, then, as Jordan states, there can be no finality in such a case. There is therefore every justification for the general adoption of Buchanan's generic designation of *Garra*, which, as has been pointed out already, has been used as such by Bleeker, Steindachner, Day, Fowler, and Berg more prominently. I also agree with Jordan that *lamtu* * is the type of the genus *Garra*, since it has been regarded by Buchanan as the representative species for his "Division *Cyprinus garra*," and also being the first species described by him under this genus. I accordingly use the term *Garra* in the place of *Discognathus*, which I think is the correct procedure, at least so far as one has to deal with forms occurring within the Indian Empire, Ceylon, and Malayan Peninsula.

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[*] 1889. Day, Fauna Brit. Ind., Fishes, i. p. 238.

[†] 1822. H. Buchanan, *op. cit.* p. 343.

[‡] 1919. Records Ind. Mus. vol. xvi. pt. i. p. 130 (Dr. Annandale regards Day, and not Buchanan, as the author of *lamta*).

[§] 1868. Gunther, Cat. Brit. Mus., Fishes, vii. p. 68.

[||] 1864. Bleeker. Mehn. Soc. Holland, Harlam, Cobit. & Cyprin. Ceylon, p. 8.

[¶] 1918. Chaudhuri, Journ. & Proc. As. Soc. Bengal, vol. xiv. no. 6, p. cxlv.

[**] 1864. Bleeker, *op. cit.* p. 8, and 1864. Zool. Rec. Pisces, p. 171.

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[*] 1865. Day, Proc. Zool. Soc. p. 297, and 1865. Fishes, Malabar, p. 205.

[†] 1867. *Id. tom. cit.* p. 349.

[‡] 1867. *Id. loc. cit.*

[§] 1867. F. Steindachner, SB. Ak. Wiss. Wien, vol. lvi. i. p. 36.

[‖] 1867. *Id. loc. cit.*

[¶] 1905. Fowler, Proc. Acad. Nat. Sci. Phil. vol. lviii. p. 482.

[**] 1913. Berg, Ann. Mus. Zool. St. Petersburg, vol. xviii. p. lxi.

[††] 1914. Regan (*Discognathus wunæ*), Ann. & Mag. Nat. Hist. (8) xiii. p. 263, fig. A.

[‡‡] 1838. McClelland, Journ. As. Soc. Bengal, vol. vii. no. 6, p. 944.

[§§] 1763. Gronow Zoophylaceum.

[‖‖] 1869. Day, Proc. Zool. Soc. p. 553.

[¶¶] 1838. McClelland, *tom. cit.* p. 947.

[***] 1849. T. C. Jerdon, Madras Journ. Lit. Sci. no. 35, pp. 309-10.

Buchanan's description of his Division *Cyprinus garra* is too brief and bald to be of any definitive value, and, having examined the somewhat rich material † in the Indian Museum, collected from various localities, and my own examples taken in equally interesting sources, I consider that the generic definition of *Garra* (*Discognathus*, part.), given by Günther and Day, requires revision—at least, in certain particulars. I proceed to append the following diagnosis, which I must state is applicable strictly to forms occurring within the limits prescribed above:—

Subfamily CYPRININÆ.

Genus GARRA, Hamilton Buchanan (1822).

1763. *Gonorhynchus*, Gronow (rejected).
1838. *Platycara*, McClelland.
1843. *Discognathus* (part.), Häckel.
1864. *Discognathus* et *Lissorhynchus*, Bleeker.
1869. *Mayoa*, Day.

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* 1917. Jordan, *op. cit.* p. 115, & 1868. Gunther, *tom. cit.* p. 68.

† 1918. Annandale, Rec. Ind. Mus. vol. xiv. p. 45. If the specimens of *Discognathus*, belonging to the collection of the Indian Museum now held up in Budapest, were also available, our position in regard to several species would have been certainly very much clearer.

Stone carps with a cylindrical or subcylindrical body, covered by scales either moderate or large[*]. Head never large, snout rounded, bearing mucous pores or spiny tubercles, chiefly in adult males, with or without a protuberance between or outside each nostril[†]. Mouth ventral crescentic with both lips well developed, the upper usually fringed and the lower invariably developed into a powerful adhesive disk[‡]; barbels short, usually four, sometimes only two or absent[§]. Pharyngeal teeth uncinate, in three closely approximate rows—2, 4, 5/5, 4, 2 or 5, 3, 1/1, 3, 5. Dorsal fin without osseous ray, upper margin slightly emarginate or deeply notched, commencing in front of the ventrals. Pectorals always horizontal, rarely exceeding the length of the head. Anal scales not generally differentiated.

Distribution.—Fresh-water forms inhabiting tanks, rivers, and hill-streams throughout the Indian Empire, Ceylon, Malayan Peninsula, and Borneo.

Synopsis of species of *Garra* collected up till now in the Mysore State and Coorg (S. India):—

1. *Garra lamta*, H. B.
2. *Garra jerdonia*, Day.
3. *Garra stenorhynchia*, Jerdon.
4. *Garra jerdonia brevimentalia*, var. n., Rao.
5. *Garra platycephala*, sp. n., Rao.
6. *Garra bicornuta*, sp. n., Rao.

SYSTEMATIC ACCOUNT OF THE SPECIES.

1. *Garra lamta*, H. B.

1822. *Cyprinus lamta*, H. Buchanan, *op. cit.* pp. 343, 393.
1841. *Chondrostoma mullya*, Sykes, Trans. Zool. Soc. ii. p. 359.
1868. *Discognathus lamta*, Günther, *op. cit.* p. 69.
1869. *Mayoa modestus*, Day, Proc. Zool. Soc. p. 553.
1871. *Discognathus modestus*, Day, Journ. As. Soc. Bengal, (2) xi. p. 108.
1878. *Discognathus lamta*, Day, Fish. Ind. Text. vol. ii. p. 527.

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[*] *Garra borneana*, Vaill., and *G. bicornuta*, sp. n., Rao, have larger scales than most Indian species.

[†] Two protuberances so far known only in *G. bicornuta*, Rao.

[‡] Feebly marked in *G. adisca*, Annan. Rec. Ind. Mus. 1919, vol. xvi. p. 68. This is a very variable structure, whose degree of development depends on the conditions amidst which the species lives.

[§] *G. imberbia*, Vincig., from Burma, has no barbels (Ann. Mus. Genova, 1889, (2) ix. (xxix.) p. 281); and *G. variabilia*, Häck., has only two, perhaps occurring within the limits of the Indian Empire (Journ. As. Soc. Bengal, (n. s.) ii. p. 8 (1906)).

1890. *Discognathus lamta*, Vinciguerra, Ann. Mus. Genova, (2) ix. pp. 275–279.
1909. *Discognathus lamta*, Jenkins, Rec. Ind. Mus. iii. p. 290.
1913. *Discognathus lamta*, Annandale, Journ. & Proc. As. Soc. Bengal, (n. s.) ix. p. 36.
1919. *Discognathus lamta*, id. Rec. Ind. Mus. vol. xvi. p. 131.
1919. *Discognathus kangræ*, Prashad, Rec. Ind. Mus. vol. xvi. p. 163.

This is perhaps the commonest species of *Garra* in the tanks and rivers of Mysore and Coorg, and also the one which exhibits extremes of individual variability. The mental disk, the dorsal, pectoral, and caudal fins, and eyes are chiefly affected by the modifying influences like still water or rapid torrents, shallow rock pools, or deep cavernous pits in the beds of rivers. This circumstance, together with the variability of scales and perhaps want of fresh or well-preserved specimens from widely different localities, must largely account for the differences of opinion regarding *lamta*. Dr. Annandale* writes: "I give Day and not Buchanan as the author of the former (*D. lamta*), because it is impossible to be sure as to the species to which Buchanan first applied the name *Cyprinus lamta*." And again he writes: "But there is some doubt as to whether Buchanan's *Cyprinus lamta* was not rather the form called *D. modestus* by Day and *Platycara nasuta* by McClelland"*.

There can be no doubt as to the indications which Buchanan has left behind him in regard to what he meant by *lamta*. In his manuscript drawings there is figure of *lamta*, though the name written by Buchanan, in his own handwriting, is *Cyprinus godiyari*. In his notes on Bhagalpur District, published in vol. xx. of the Statistical Account of Bengal, he refers to this *C. godiyari*, and further in his notes on Gorakpur District (p. 105) he mentions that the *C. godiyari* of Bhagalpur is the same as *C. lamta* of Gorakpur.

Accordingly, there can be no doubt whatsoever as to what Buchanan's *C. lamta* is, as described in his 'Fishes of the Ganges' (1822). It may be further stated that the MSS. drawing referred to is the protograph †, and having compared the descriptions of Buchanan and of Day, with the help of the material in the Indian Museum and in my own collection, I arrive at the conclusion that the *lamta* of Day is identical with the *lamta* of Buchanan.

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* 1919. Rec. Ind. Mus. vol. xvi. pp. 130, 131.

† I am indebted to Dr. B. L. Chaudhuri for this information. In an addendum to his paper "On the Fish of the Genus *Discognathus*" (Rec. Ind. Mus. vol. xviii. p. 77, 1919) Dr. Annandale briefly discusses the same point, and acknowledges information to the same authority.

Further, Day's *lamta* is considered to be the same as his *modestus* by Jenkins*, with whom I entirely agree. Dr. Annandale†, however, regards the latter, possibly on the basis of six anal fin-rays, as synonymous with McClelland's *nasutus*, thus agreeing with Günther in assigning it the rank of a separate species in opposition to Day. In discussing the specific distinctions of *nasutus*, Dr. Annandale‡ notices that a greatly enlarged adhesive organ (*c*), and the simple and flattened outer pectoral rays (*e*), form exclusive characters, and I may point out that several examples of *lamta* obtained from the rapid streams, like the Harangi in Coorg, show these very characters, which accordingly may be disregarded. Then the other character—viz., six anal fin-rays on which Day separates his *lamta* and *jerdoni* from *modestus*—is uniformly common in several examples of *lamta*, both in my collection and in that of the Indian Museum, and I may state that this is also the experience of Jenkins. The other specific characters mentioned by Day for his *modestus*, as Jenkins has pointed out, also break down when a very large number of examples of *lamta* from widely different localities are examined, and, as I am unable at present to discover any sufficient ground for separating Day's *modestus* from his *lamta*, I have in this paper treated the former as synonymous with Buchanan's *lamta*. In the absence of more material than is available at present in the Indian Museum, it is difficult to say whether *nasutus* is only a local race of *lamta* or a new species.

I rewrite the formula for *Garra lamta* of its fin-rays and lateral transverse rows of scales thus:—

D. 10–11 (2–3 . 2/8–9). P. 15. V. 9. A. 6–7 (1–2, 5).
C. 17–19. L. l. 30–37. L. tr. 4–4½, 3½–4½.

(1) Specimens with spine-covered mucous glands on the snout are not peculiar to the Salt Range in the Punjab or the Chumba District§; they commonly occur in Mysore and Coorg.

(2) The occurrence of a spiny protuberance is a purely secondary sexual character.

(3) A greatly enlarged mental disk and an expansive pectoral fin, with a larger number of simple rays, are associated with forms occurring in the rapid streams.

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* 1909. Jenkins, *op. cit.* p. 292.

† 1919. Annandale, Rec. Ind. Mus. vol. xvi. p. 132.

‡ 1919. *Id. op. cit.* p. 133.

§ Day, Fishes—Fauna, Brit. Ind. vol. i. p. 246.

(4) Younger specimens possess an interesting scheme of coloration, in which the orange is confined to the fins more often than not *.

The description of *D. kangræ* † suffers from certain defects—for example, the number of caudal fin-rays is not indicated, and it is not clear whether or not the length of the caudal fin is included in the total length of the body. The dorsal profile behind the dorsal fin is described as being slightly concave and the upper lip as being fairly broad. These descriptions do not conform to the protograph. I have examined the type and syntypes of this species in the Indian Museum, and find that the lateral and transverse series of scales—viz., 35 and 4/3½ respectively—are correctly represented in the text-figure, and not 34 and 4/5 as stated in the description. The caudal fin-rays are 19. The reasons for considering *kangræ* as a separate species by its author are—(1) the proportions of the different parts of the body, (2) the shape and size of mental disk, (3) the situation of the eye, and (4) the shape of the tail and dorsal fin. As I have already stated that characters 2 and 4 are very variable among *lamta*, it would be risky to consider them to be of specific importance. The measurements of *kangræ* I have taken are as follows (measurements in hundredths of total length without caudal fin):—

	kangræ.	*lamta.*
	mm.	mm.
Total length without caudal fin	95	95
Depth of body	22·1	22·6
Depth of caudal peduncle	12·6	12·7
Depth of head at occiput	18·9	19·1
Length of head	24·1	23·6
Width of interorbital space	16·7	16·9
Length of snout	13·6	13·0
Diameter of orbit	4·2	4·2
Length of caudal peduncle	17·8	17·9

It will be seen from the above measurements of the two species (I have taken a well-preserved *lamta* of the same size for comparison) that the only real point of difference between *lamta* and *kangræ* is the relative length of head, which, I consider, is too insufficient a basis for founding a new species upon. Till more material is forthcoming, when

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* *Vide* description of *Garra malabarica*, Day, 'Fishes of Malabar,' p. 206, pl. xv. fig. 1. This is the usual coloration of younger forms of *G. lamta*, which fades in the preserving fluids.

† 1919. Prashad, *op. cit.* text-figs. p. 164.

kangræ may perhaps be considered as a variety of *lamta*, I propose to treat *kangræ* as synonymous with *lamta*. It is needless to observe that the other differences in the measurements must be due to conditions of preservation, food, and maturity of the specimens. The formula of rays and scales for *kangræ* is almost the same as for *lamta* [*].

2. *Garra jerdonia*, Day.

1878. *Discognathus jerdoni*, Day, Fish Ind. Text. ii. p. 528.
1909. *Discognathus jerdoni*, Jenkins, Rec. Ind. Mus. vol. iii. p. 291.
1919. *Discognathus jerdoni*, Annandale, Rec. Ind. Mus. vol. xvi. p. 132.
1919. *Discognathus jerdoni*, Annandale, Rec. Ind. Mus. vol. xvii. p. 73, pl. ix. figs. 1, 2, and pl. xi. fig. 3.

My specimens of *jerdonia* have been taken chiefly in the rapidly running waters of the Cauvery, both in the Mysore State and Coorg. Having examined a fairly large collection of this species, I think it is impossible to maintain with Günther that it is identical with *lamta*. As Dr. Annandale proposes to discuss this and the following species in his forthcoming paper, I content myself here with recording their occurrence in Mysore, hoping for a future opportunity for offering such remarks on them as may be called for.

3. *Garra stenorhynchia*, Jerdon.

1849. *Gonorhynchus stenorhynchus*, Jerdon, Mad. Journ. Lit. Sci. p. 310.
1919. *Discognathus stenorhynchus*, Annandale, Rec. Ind. Mus. vol. xvii. pl. ix. fig. 3, pl. xi. fig. 4.

Jerdon's account of this species, obtained in the Bhavani River (foot of the Nilgiri Hills) and the streams of Malabar, is absolutely brief. My specimens, which were obtained from the rocky pools in the Cauvery (Seringapatam), show a relatively larger internasal protuberance studded with spiny mucous pores, the upper lip thick and suctorial, the upper surface of the head proportionately much broader, and a greatly enlarged mental disk.

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[*] I have, since writing the above, noticed that *kangræ*, Prashad, is regarded by Dr. Annandale (1919, *op. cit.* p. 74) as a subspecies of *jerdoni*. "This form seems to be no more than a local race of *D. jerdoni*, Day, distinguished by its longer head and smaller eye." I consider, for the reasons given above, that it is more correct to treat it as a subspecies of *lamta*.

4. *Garra jerdonia brevimentalia*, var. n.
(Pl. I. figs. 1, 1 *a*, 1 *b*.)

I propose to describe this variety in detail, and later briefly indicate the points of difference between it and the foregoing species, *G. jerdonia*, Day.

D. 11 (2/9). P. 12–13. V. 10. A. 8 (1/7). C. 17–18.
L. l. 32. L. tr. 5–5½/2½–4 *.

The body is cylindrical, the ventral surface rather broad, compressed behind the vent. The dorsal profile in front of the dorsal fin is distinctly convex and, behind it, gently slopes towards the caudal fin. The ventral profile in front of the ventral fin is equally convex. The height of the body in front of the dorsal fin is contained slightly more than 3¾ times in the total length without the caudal fin, and the depth of the caudal peduncle at its narrowest part is less than 7¾ in the total length. The head is small comparatively, and its length is contained nearly 4½ times in the total length, and the depth at the occiput is exactly 5⅔ times in the total length. The upper profile of the head gently slopes down to tip of snout. The eyes, placed in the middle of the head, are small, whose diameter is three in the interorbital distance, which is broader than the length of snout. The interorbital space is convex or slightly flat. The snout is obtuse, very faintly grooved between the nostrils, covered with open mucous pores, which are rather small. The upper lip is large and fringed, the mental disk is subtriangular, the labial fold being nearly as wide as the cartilaginous pad. Both folds are granular. The anterior barbels equal the posterior ones, or are only slightly longer. The chest nearly free from scales †. A very large obtuse angle is formed by the opercular folds with the mental disk. The length of the pectoral fin equals the distance between its anterior root and tip of snout, which also equals the longest dorsal fin-ray. The longest anal and ventral fin-rays nearly equal. The caudal peduncle merges insensibly into the root of the caudal fin, which is lobed. The upper lobe nearly always longer than the ventral lobe. The coloration is variable. Uniform reddish all over, with the lower surface of snout and mental disk redder, or uniform olive-green, somewhat clouded darker on the back. A dark pectoral spot. Sides in the green forms are bright yellow, fading into paler yellow on the ventral surface. A dark streak along the middle of the caudal fin and the outer margin of the pectoral and anterior margin of the dorsal fins, somewhat bronzed.

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* 4½ shown in the protograph is incorrect.

† 1913. Annandale, Journ. Proc. As. Soc. Bengal, vol. ix. no. 1, p. 37. This condition is certainly different from the undescribed Manipur form referred to by Dr. Annandale.

Measurements * in hundredths of total length without caudal fin :—

	mm.
Total length without caudal fin	85
Depth of body	25
Depth of caudal peduncle	12·9
Length of head	22·3
Depth of head	17·6
Interorbital space	10·5
Length of snout	9·4
Diameter of orbit	4·6
Distance from tip of snout to anterior end of dorsal fin	47·5
Height of longest dersal ray	20
Distance between tip of snout to root of pectoral fin	20
Length of pectoral fin	20
Distance from tip of snout to vent	70·5
Distance from tip of snout to anterior end of ventral fin	5·9
Distance from tip of snout to anterior root of anal fin	75·2
Height of longest ventral fin-ray	17·6
Height of longest anal fin-ray	17·2
Length of caudal peduncle	15·2
Length of longest caudal fin-ray	22·3
Height of root of caudal fin	13·5

Type-specimen.—Only six specimens were obtained in the Harangi River (Madapur, Coorg), which is a very rapid stream flowing over rocky beds. The type-specimen and two syntypes have been forwarded to the British Museum and two more to the Indian Museum. The remaining one is kept in the Central College Museum, Bangalore.

The several points of difference between *jerdonia* and *jerdonia brevimentalia* may be summarised thus :—

(1) *Eyes.*—As measured in examples in my own collection and those from the river Bhavani (S. India) and from Kangra Valley (Punjab) belonging to the Indian Museum, they are in *jerdonia* 3⅔ to 4 in the length of the head and one diameter from end of snout, and two diameters apart. This is in accordance with Day also †.

* References to terminology employed in the measurements:—1895. Boulenger, Cat. Fish. Brit. Mus. (2nd ed.) vol. i. pp. xi–xii: 1901. Jordan, Proc. M. S. Nat. Mus. vol. xxiii. pp. 737-769.

† Day, Fauna of Brit. India, Fish. vol. i. p. 248.

In *jerdonia brevimentalia*, the eyes are more than four times in the length of the head, 2 diameters from end of snout, and 2½ diameters apart.

(2) *Mental disk.*—In *jerdonia*, broadly subcircular, the lower labial fold is just half the width of the central pad; chest covered with largish scales *.

In *jerdonia brevimentalis*, the metal disk is subtriangular, the lower labial fold nearly equals the width of the pad. Chest nearly free from scales (*vide* Pl. I. fig. 1 *a*).

(3) *Fins.*—In *jerdonia*, the pectoral fin is shorter than the dorsal, and the ventral shorter than the anal. In *jerdonia brevimentalia* these sets are nearly equal, and the caudal fin is proportionately longer.

(4) The other points refer to the number of fin-rays and scales, which are summarised in the description of *jerdonia brevimentalis*.

5. *Garra platycephala*, sp. n.
(Pl. I. figs. 2, 2 *a*, 2 *b*.)

D. 10–11 (1/9–10. P. 14–15. V. 10. A. 7–8 (1/6–7).
C. 19–20. L. l. 37–39. L. tr. 4½/4½.

The head, which is greatly flattened, slopes somewhat abruptly towards the snout, and its length is about five times in the total length without the caudal fin. The depth of the head nearly equals its width behind the eyes. The snout is produced and may be rounded or acute. The diameter of the eye is contained four times in the length of the head, and is only half the interorbital space. It is also less than half the length of snout. End of snout more or less pinched off by a deep groove, which may extend on both sides of the cheek, and both surfaces covered by fairly open mucous pores. Anterior barbels nearly twice as long as the posterior ones, which are hardly visible beyond the hinder labial fold. The outer rays of the pectoral and pelvic fins, which are nearly equal in length, are simple and greatly flattened. The pectoral fin nearly as long as the head or the caudal peduncle. The depth of the caudal peduncle is considerably less than half the height of the longest dorsal fin-ray. The chest is somewhat free from scales or only covered by feebly developed ones. The caudal fin is deeply lobed, the upper lobe being longer.

The colour above is light olivaceous, slightly brownish on the head. Upper part of snout pale blue or grey. Sides of body yellow with a dark green lateral band. Ventral surface yellowish. Lower lobe of caudal fin clouded dark, so also the outer margins of the paired fins. A blue pectoral spot may or may not be present. This coloration of fresh specimens fades in preserved forms.

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* 1919. Annandale, Rec. Ind. Mus. pl. xxvii. fig. 3.

Measurements in hundredths of total length without caudal fin :—

	mm.
Total length without caudal fin	118
Depth of body	17·7
Depth of caudal peduncle	10·1
Length of head	20·2
Depth of head	13·5
Width of head behind the eyes	13 5
Length of snout	18·8
Diameter of orbit	5·03
Width of interorbital space	11·01
Distance from tip of snout to anterior root of dorsal fin	42·3
Height of the longest dorsal fin-ray	22·03
Distance from tip of snout to anterior root of pectoral fin	19·4
Longest pectoral fin-ray	18·6–20·1
Distance from tip of snout to vent	56·7
Distance from tip of snout to anterior root of ventral fin	46·6
Longest ventral fin-ray	18·6–19·4
Distance from tip of snout to anterior root of anal fin	74·5
Longest anal fin-ray	15·2
Length of caudal peduncle	20·2
Longest caudal fin-ray	25·4
Height of root of caudal fin-ray	11·8

Type-specimen.—Only three specimens of this fish are included in my collection. The proterotype is sent to the British Museum, and one of the syntypes is presented to the Indian Museum, while the other is kept in the Central College Museum, Bangalore.

Locality.—These specimens were collected in the Cauvery, Seringapatam (Mysore), along with *G. lamta* and *G. stenorhynchia* towards the summer of 1917.

6. *Garra bicornuta*, sp. n.

(Pl. I. figs. 3, 3 *a*, 3 *b*.)

D. 11 (2/9). P. 17. V. 12. A. 8 (1/7). C. 20.
L. l. 30–31. L. tr. 3½–4, 3½–4.

The dorsal profile in front of the dorsal fin is broadly convex, and behind the dorsal fin it is nearly horizontal or only very gently slopes down to the caudal fin. The length of the head, which is moderate, is contained slightly less than

4½ times in the total length without the caudal fin. The greatest depth of body is considerably less than the height of the longest dorsal fin-ray. The depth of the caudal peduncle is contained five times in the distance between the tip of snout and the anterior root of the anal fin. The eyes are large, the diameter of which is contained 3·1 times in the length of the head is more than half the length of snout and is contained 1·5 times in the width of the interorbital space. The upper profile of the eye is almost conterminous with that of the protuberance in front of it, and in old examples the tip of the protuberance is studded with spiny mucous pores. The length of the protuberance is nearly half the length of the snout or is 8/9 of the diameter of the eye. From the anterior margin of the interorbital space, there is a sudden, almost vertical drop. The internasal portion forms almost a third protuberance, which is, however, sunk and which like the orbital processes is covered anteriorly by tubercles. The snout below the nostrils is again sunk and is marked off by deep grooves into four tubercular areas, which are prominent. The anterior barbels are nearly twice as long as the posterior ones. The mental disk is moderate, and the central pad is about 1¼ times broader than the lower labial fold, whose posterior margin is nearly straight and at right angle to the long axis of the body. The dorsal and caudal fins are deeply indented. The pectoral and ventral fins are equal in length to the distance between the snout and the anterior root of the former. The anal fin is 1½ times the depth of the caudal peduncle and is longer than the paired fins. The length of the peduncle is 2/3 of the longest caudal fin-ray. The upper lobe of the caudal fin is much longer than the lower, and the longest ray of the upper lobe may be quite as long as the longest dorsal fin-ray. The outer pectoral and pelvic fin-rays are very stout. The scales are large.

The colour of the older forms is somewhat uniform, slightly reddish brown above, pale yellowish below. The central pad of the disk is rufous, the lower labial fold dark, relieved in front by a white semicircular collar. The greater portion of the paired fins is clouded dark, with brown horizontal streaks in the middle of the caudal fin. In the younger forms the prevailing colour is a warm olive-green above, sides and ventral part yellow. The paired fins are bright orange and the mental disk reddish, the other fins light with brownish streaks. A lateral orange band is occasionally present. Head frequently red or reddish brown or grey.

Measurements in hundredths of total length without caudal fin:—

	mm.
Total length without caudal fin	132
Depth of body	26·5
Depth of caudal peduncle	15·1
Length of head	21·7
Depth of head	19·6
Width of head behind the eyes	15·9
Length of snout	11·5
Diameter of orbit	6·8
Width of interorbital space	10·6
Distance from tip of snout to anterior root of dorsal fin	45·4
Height of the longest dorsal fin-ray	31·06
Distance from tip of snout to anterior root of pectoral fin	19·6
Longest pectoral fin-ray	19·6
Distance from tip of snout to vent	69·6
Distance from tip of snout to anterior root of ventral fin	49·2
Longest ventral fin-ray	19·6
Distance from tip of snout to anterior root of of anal fin	75·7
Longest anal fin-ray	22·7
Length of caudal peduncle	18·4
Longest caudal fin-ray	27·2–31·06
Height of root of caudal fin	14·4

Type-specimen.—Several examples of this species are in the collection. The type and three co-types are sent to the British Museum and a similar number of syntypes are presented to the Indian Museum.

Locality.—They were obtained for the first time by my collleague, Mr. A. Subba Rao, from the River Tunga in Shimoga (Mysore State), towards the end of the summer recess in 1917, and have since been obtained by myself from the same source.

Subfamily *Cobitidinæ.*

Genus Botia.

The occurrence of loaches belonging to this genus in the south of the Deccan has not been reported till now. Dr. B. L. Chaudhuri has described not long ago two new species of *Botia*—viz., *B. birdi* * and *B. lohachata* † obtained from Rupar (the Punjab) and from the Gandak River, Bihar, respectively, and the species described below is therefore the first new one to be mentioned from S. India.

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* 1909. Chaudhuri, Rec. Ind. Mus. vol. iii. p. 339.

† 1912. *Id. op. cit.* vol. vii. p. 441, pl. xl. fig. 2.

7. *Botia striata*, sp. n.
(Pl. II. figs. 4, 4 *a*, 4 *b*.)

D. 11–12 (2, 9–10). P. 13–14. V. 8. A. 7–8 (1/6–7). C. 19.

The body is greatly compressed laterally and the dorsal profile in the front of the dorsal fin is a broad incline, which becomes an abrupt descent from the eyes to the snout. The depth of body is contained about $3\frac{1}{3}$ times in the total length without the the caudal fin, and is only very slightly greater than the length of head. The caudal peduncle is almost squarish, being slightly deeper than long. The head is greatly compressed, and its length is nearly equal to the distance between the tip of snout and the anterior root of pectoral fin. The width of head is just half its own depth. The eyes are moderate, their diameter is contained five times in the length of the head and is slightly more than half the length of the suborbital spine. The spine is bifid at the base. Barbels 8, subequal, the shortest pair being the mandibular ones. The mouth is crescentic when shut and is an oval aperture when open. The distance between the angles of the mouth, if widely opened, is equal to the diameter of the orbit. The upper lip overhangs the lower, both somewhat thick and suctorial. The dorsal fin arises in front of the root of the ventrals and both are behind the middle point in the total length of body without the caudal fin. The height of the dorsal fin is equal to the length of the anal fin, and the ventral * is shorter than these two. The length of the pectorals is less than twice the length of the suborbital spine and is longer than the snout. The margin of the dorsal fin is entire, that of the dorsal fin is deeply lobed, the lobes being equal. The anterior nostril is surrounded by a very broad glandular fold, which covers the posterior nares; the opening of the latter is a wide funnel, that of the former is a slit masked by the glandular lips of the fold. Muciferous glands are few, present on the head and on the sides of the operculum. The lateral line is entire and straight, terminating anteriorly in the upper corner of the gill-opening; is rarely continued forward by a row of muciferous glands. Scales are absent on the head, operculum, and chest. They are small and non-deciduous.

The colour of this loach is most beautiful. The body is diversified by broad dark and narrow yellow bands, which from behind the nape form oblique hoops directed backwards; these bands completely surround the body. The broad dark bands may bear light streaks of variable number, forming complete or incomplete hoops. These narrow white bands may be broken into small elegant dots. This beautiful pattern may be on a background of a pale pink or a deep yellow. These two primary types of dark and yellow bands are broader on the sides of the head and are directed obliquely forwards. On the upper surface of the head, the dark and yellow streaks form a trident mark. The posterior part of the caudal peduncle may be clouded by a deep bronze, which obscures occasionally the scheme of bands and dots. The chest is somewhat greenish in freshly captured specimens, fading almost into a white in the preserving fluids. The fins are white and are barred, the caudal fin bearing two entire and two to three interrupted stripes. The whole scheme of striation on the body is suggestive more of the zebra.

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* In fig. 4 the ventral fin is slightly exaggerated, so also is the lower lobe of the caudal fin.

Measurements in hundredths of total length without caudal fin:—

	mm.
Total length without caudal fin	70
Depth of body	29·5
Depth of caudal peduncle	17·1
Length of head	28·5
Depth of head	22·8
Width of head behind eyes	11·4
Length of snout	15·7
Diameter of orbit	5·7
Width of interorbital space (measured over the arch of head)	14·2
Width of interorbital space (measured across head)	9·5
Width of mouth	7·1
Distance from tip of snout to anterior root of dorsal fin	57·1
Height of longest dorsal fin-ray	14·2
Distance from tip of snout to anterior root of pectoral fin	28·5
Longest pectoral fin-ray	18·5
Distance from tip of snout to vent	74·2
Distance from tip of snout to anterior root of ventral fin	62·9
Longest ventral fin-ray	13·5
Distance from snout to anterior root of anal fin	85·7
Longest anal fin-ray	14·2
Length of caudal peduncle	16·6
Longest caudal fin-ray	25·7
Height of root of caudal fin	17·1

Type-specimen.—There are eleven specimens in the collection. The type and four more examples are sent to the British Museum and four presented to the Indian Museum. The rest is kept in the Central College Museum, Bangalore.

Locality.—These loaches have been obtained in the River Thunga, Shimoga Town, Mysore State, South India.

Genus NEMACHILICHTHYS.

It is rather doubtful whether the species called by Sykes *Cobitis ruppelli*[*] is identical with Day's *Nemachilichthys rueppelli*[†]. The type of this species, described by Day, is in the Indian Museum, and is not in a condition for a detailed examination. One has to supplement therefore very largely from his figure, which, however, is a protograph. Sykes gives the following formula for his *C. ruppelli*:—

(1) D. 13 (1/12). P. 12. V. 8. A. 8. C. 19; and
(2) D. 13 (2/11). P. 13. V. 8. A. 7 (2/5). C. 19, is Day's diagnosis.

The coloration of Sykes's figure has nothing whatever to do with Day's *rueppelli*, though his description is quite different. It is further mentioned by Sykes that his species is nearly cylindrical, scaleless, not much thicker than a large goose-quill, and from two or three inches long. Day's specimen is slightly under three inches, and does not fit in with the above description. Sykes mentions that the dorsal fin in his specimen of *ruppelli* is longer than any except the caudal, and in Day's specimen it is certainly shorter than the anal also. Then, the tail-fin in *C. ruppelli*[‡] is described as "rather notched than forked," while in Day's type it is deeply forked. I have for these reasons some hesitation in regarding that Day was correct in thinking that *Cobitis ruppelli* is identical with *N. rueppelli.*

8. *Nemachilichthys shimogensis*, sp. n.

(Pl. II. figs. 5, 5 *a*, 5 *b*.)

D. 14 (2/12). P. 12–13. V. 8. A. 7 (2/5). C. 20.

The dorsal profile in front of the dorsal fin is horizontal up to the upper margin of the eyes, and the profile of the head in front of the eyes is a steep incline. The upper surface of the body is, in fresh and well-preserved specimens, excavated by two trough-like depressions, the anterior between the dorsal fin and the occiput, and the posterior one from the dorsal fin to the end of caudal peduncle. On the ventral surface there are similarly two deep grooves, one between the base of the ventral and anal fins, and the second between the latter and the root of the caudal fin. The depth of body is contained $5\frac{2}{3}$ times in the total length without the caudal fin. The dorsal surface of head is convex and its length is contained about four times in the total length. The depth of head is less than half its length, and its width behind the eyes is contained slightly more than $2\frac{1}{2}$ times in the cephalic length. End of snout blunt and elevated, and its length is more than half the length of head. The upper surface of head is also convex. The lumen of the mouth when shut is horseshoe-shaped; its upper lip produced into a forward fleshy fold and the lower lip divided into two fleshly protuberances. The barbels (six) are subequal, thick at the base, and flagellate towards the tips. The eyes are directed upwards and their diameter is 3 in the length of snout and they are less than one diameter apart. The nostrils are separated by a glandular fold, which, reflected back, covers the posterior nares. On both sides of the snout there is a fairly deep muciferous canal or groove, which arises near the tip of snout and may stop in front of the eyes or may be continued below and behind them. Muciferous glands are few, scattered on the snout and head. The perpendicular from the first dorsal fin-ray passes through the middle point in the total length without the caudal fin, and the height of the dorsal ray equals the pectoral. The ventral fin is equal to either of these or is shorter. The longest anal ray exceeds the length of the caudal peduncle. The depth of the caudal peduncle is less than its own length, and corresponds to the width of head behind the eyes. The tail-fin is deeply forked, the two lobes being equal. The longest tail fin-ray is shorter than the distance between the tip of snout to anterior root of pectoral fin. The scales are small and non-deciduous, absent on the head, chest, and nearly the whole abdomen. The lateral line is entire and is somewhat concave in the anterior half of the body.

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[*] 1841. Sykes, Trans. Zool. Soc. p. 366, pl. lxiv. fig. 1.

[†] 1878. Day, Fish. Ind. p. 612, pl. clvi. fig. 7.

[‡] Sykes's *ruppelli* may be some local variety of *Cobitis cilturis* (should be *bilturi*) H. B. or *Cobitis botius* H. B. (Fish Ganges, pp. 350, 394), for Sykes himself acknowledges close affinity between his *Mureh* (*ruppelli*) and Hamilton and Buchanan's *bilturi*.

The colour is a beautiful orange with brown bars, continuous dorsally and descending to the ventral margin of the body. A few shorter intermediate bars also present. The unbroken bands being from 15 to 20. The dorsal fin is barred and the black dots thrown into relief by a white edge below each. The caudal fin is chĕvrotained with brown. An almost ocellus-like blue spot in the middle of the root of the tail-fin. Head in freshly captured specimens is brownish or reddish. Throat is white, and the whole of the abdominal surface is orange.

Measurements in hundredths of total length without caudal fin :—

	mm.
Total length without caudal fin	85
Depth of body	17·6
Depth of caudal peduncle	10·0
Length of head	25·2
Depth of head	11·7
Width of head behind eyes	10·0
Length of snout	14·1
Diameter of orbit	4·7
Width of interorbital space	3·5
Width of mouth	5·8
Distance from tip of snout to anterior root of dorsal fin	50·5
Height of longest dorsal fin-ray	16·4
Distance from tip of snout to anterior root of pectoral fin	24·7
Longest pectoral fin-ray	16·4
Distance from tip of snout to vent	68·2
Distance from tip of snout to anterior root of ventral fin	56·4
Longest ventral fin-ray	16·4–16·2
Distance from tip of snout to anterior root of anal fin	82·7
Longest anal fin-ray	14·1
Length of caudal peduncle	12·9
Longest caudal fin-ray	20·2
Height of root of caudal fin	11·8

Type-specimen.—Several specimens are contained in the collection. The type and about six syntypes are forwarded to the British Museum and a number of examples are presented to the Indian Museum.

Locality.—Obtained from the Thunga River, Shimoga Town (Mysore), S. India. A few examples of this species and the foregoing were taken by my colleague, Mr. A. Subba Rao, from the same source.

EXPLANATION OF THE PLATES.

Plate I

Fig. 1. *Garra jerdonia brevimentalia*, var. n. ½ nat. size.
Figs. 1 *a*, 1 *b*. Ditto. × ¾.
Fig. 2. *Garra platycephala*, sp. n. ½ nat. size.
Figs. 2 *a*, 2 *b*. Ditto. × ¾.
Fig. 3. *Garra bicornuta*, sp. n. ½ nat. size.
Figs. 3 *a*, 3 *b*. Ditto. ½ nat. size.

Plate II.

Fig. 4. *Botia striata*, sp. n. × ¾.
Figs. 4 *a*, 4 *b*. Ditto. × ¾.
Fig. 5. *Nemachilichthys shimogensis*, sp. n. × slightly more than ¾.
Figs. 5 *a*, 5 *b*. Ditto. × slightly more than ¾.

III.—*Fossil Arthropods in the British Museum.*—III.

By T. D. A. Cockerell, University of Colorado.

The present part deals wholly with Coleopterous elytra from the Eocene.

Mr. R. J. Tillyard*, describing some fossil beetle elytra from Australia, remarks:—"The placing of single elytra, however perfect, can seldom be more than a matter of conjecture, since there are scarcely any types of sculpture that are confined to one family only. But, where the fossil specimen is well enough preserved, it is nevertheless usual to name it. Thus, a number of what may be termed 'genera of convenience' have arisen, of which it may be said that each one serves to gather together, as a single group, all those fossil elytra which show correspondence in shape and sculpture, within certain limits. An example of such a genus is *Ademosyne*, Handlirsch, from the Ipswich beds. Under this name are now comprised no less than ten species, which might belong to the Hydrophilidæ, Parnidæ, or Tenebrionidæ, the type of elytron which they represent being commonly found in all three families."

In the case of the elytra described below, the uncertainty referred to by Mr. Tillyard exists; though it might, perhaps, be removed, at least in part, by one more familiar with the Coleoptera of the world. An intensive morphological study of Coleopterous elytra, with large quantities of material, would probably reveal many significant diagnostic features, which could be seen in the fossils. In the meanwhile, however, all these elytra present excellent *specific* characters, and are, I think, perfectly recognizable. They can accordingly be used in stratigraphy and in estimating the resemblances and differences between Cenozoic faunæ. For these reasons alone it appears justifiable to make them known.

Carabites cuneatus, sp. n. (Fig. 1.)

Elytra 8·5 mm. long and slightly over 4 wide, the base broadly truncate, the apex narrowed but obtuse, the outer margin gently curved; ten delicately punctured and feebly impressed striæ, the outer one failing below the humeral angle, and supplemented by a short stria a short distance mesad of it; a fine curved sulcus or impressed line, independent of the striæ, extending inward and downward from the humeral region, and finally passing apicad, nearly parallel with the inner margin. In the punctured striæ there are about two punctures in 160 μ.

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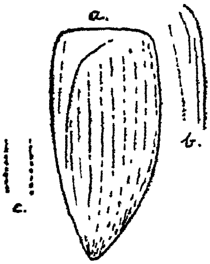
* Proc. Linn. Soc. New South Wales, xliii. (1918) p. 749.

Bartonian, Bagshot Beds, Bournemouth (*Gardner*). British Museum, 19014, with reverse.

Fig. 1.



Carabites cuneatus, sp. n.

I sent a sketch of this elytron to Mr. S. A. Rohwer at the U.S. National Museum, asking him to seek the advice of the well-known Coleopterists Messrs. Barber and Schwarz. He writes:—"I have shown your drawing of the beetle elytron to both Barber and Schwarz, and they agree that it might be that of a good many different groups of beetles, but suggest it may possibly be that of a Carabid, and possibly a Harpalid. The 'sulcus' is produced by the fold of the elytron, and the small part is 'epipleurite' of the elytron turned under. It is probable that the view you have is from the under side. By the study of a detached elytron of any large Carabid you can easily see what the 'sulcus' of the fossil really is."

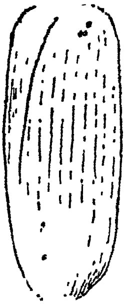
Carabites parallelus, sp. n. (Fig. 2.)

Elytra about 10 mm. long and slightly over 4 wide, the actual apex not preserved, but evidently very obtuse; margins subparallel; sculpture as in 19014, with the same curved sulcus.

Bartonian, Bagshot Beds, Bournemouth (*Gardner*). British Museum, 18999.

I had referred this and the previous species to *Hydrophilites*, but follow the opinion as to possible affinities expressed by Messrs. Barber and Schwarz.

Fig. 2.

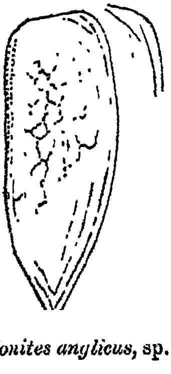


Carabites parallelus, sp. n.

Tenebrionites (gen. nov.) *anglicus*, sp. n. (Fig. 3.)

Elytra 9·5 mm. long, 3·8 wide, base obliquely truncate, apex sharply pointed; inner margin from 1·5 mm. from base to 3 mm. from apex, straight, with two rows of rather coarsely punctured striæ parallel with it, the first marginal, the second less than half a millimetre from it; rather widely spaced and indistinct striæ converge toward the apex, but the disc shows no distinct striæ, and its surface is broken up into irregular subreticulate areas, defined by impressed lines; humeral region with a very oblique short stria.

Fig. 3.



Tenebrionites anglicus, sp. n.

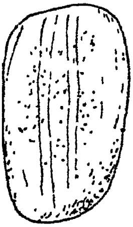
Bartonian, Bagshot Beds, Bournemouth (*Gardner*). British Museum, 19015.

The sculpture is suggestive of certain Tenebrionids, as *Asida opaca*, Say. The shape, especially the inner margin, recalls the Siberian Jurassic fossil *Doggeria sibirica*, Handlirsch. (The species which Handlirsch refers to *Doggeria* are probably not congeneric, so *D. sibirica* is herewith designated the type of the genus.)

Chrysomelites quadrilineatus, sp. n. (Fig. 4.)

Elytra 5·5 mm. long, a little over 3 broad; subquadrate, with obliquely truncate base and apex; outer margin feebly convex; surface minutely pustulose; disc with two pairs of parallel longitudinal striæ, not deeply impressed, the outermost of one pair 1 mm. distant from the outermost of the other. There are no dark bands or markings; as preserved the elytron is pale ferruginous.

Fig. 4.



Chrysomelites quadrilineatus, sp. n.

Bartonian, Bagshot Beds, Bournemouth (*Gardner*). British Museum, 19006, with reverse.

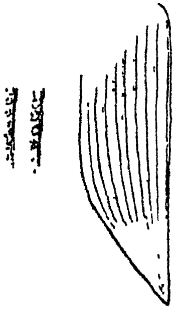
The parallel striæ suggest the fossil *Pachycoleon woodlei* (Westwood), from the Lower Purbeck. The insect appears to belong to the Chrysomelidæ, but cannot be referred with any assurance to a living genus.

Carabites peracutus, sp. n. (Fig. 5.)

Elytra 11·4 mm. long, 4·3 mm. broad; cuneate, with straight inner margin, strongly convex outer margin, and very acute apex; a stria close to inner margin, and eight other ones, sharp and distinct, but failing about 3·5 mm. from apex; on close examination the striæ are seen to be obscurely and rather coarsely punctate.

Bartonian, Bagshot Beds, Bournemouth (*Gardner*, 21). British Museum, 19018.

Fig. 5.



Carabites peracutus, sp. n.

Resembles *Carabites gardneri*, Ckll., but that is considerably larger, with the striæ strong to the apex and the inner margin gently curved before the apex.

Buprestites purbecensis, sp. n. (Fig. 6.)

Elytra probably about 11 mm. long (9 mm. preserved), 3·6 mm. wide, acute at apex; eleven sharp striæ, four in 1 mm. transversely (in 19018 the striæ are half a millimetre apart); striæ extending to the apical region and not distinctly punctured.

Fig. 6.

Buprestites purbecensis, sp. n.

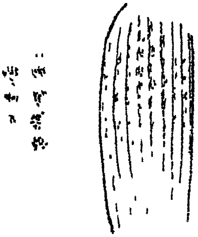
Upper Eocene, Bagshot Beds, Studland Bay, Isle of Purbeck, Dorset (*Brodie*). British Museum, 10423.

Very much like modern *Buprestis*, but the apex appears to be sharper than usual.

Curculionites brenthiformis, sp. n. (Fig. 7.)

Elytra probably at least 13 mm. long (11·3 mm. preserved), 4 mm. wide, nearly parallel-sided, the humerus gently rounded, apex lost. Nine coarse strong striæ (in middle half a millimetre apart), more or less distinctly interrupted by large shallow depressions, about three in 2 mm. longitudinally.

Fig. 7.

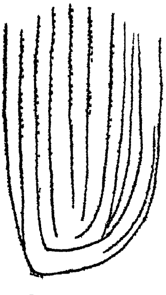


Curculionites brenthiformis, sp. n.

Bartonian, Bagshot Beds, Bournemouth (*Gardner*, 8 and 15). British Museum, 19007, with reverse.

The punctiform depressions are too large and shallow for an Elaterid, and appear to indicate an unusually elongate member of the Rhynchophora, similar to the Brenthidæ.

Fig. 8.



Chrysomelites bartonicus, sp. n.

Chrysomelites bartonicus, sp. n. (Fig. 8.)

Elytra probably about 7 mm. long (6 mm. preserved), 3 mm. wide; apex very obtuse, subtruncate; ten very finely punctured striæ, sharp and distinct, with the arrangement shown in the figure. No markings are preserved.

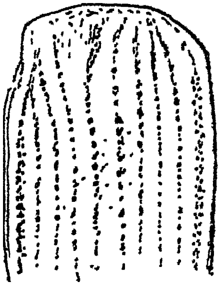
Bartonian. The label is lost, but the soft white iron-stained rock agrees with that of 19022, from the Bagshot Beds, Bournemouth (*Gardner*). I have marked the specimen ×.

The form agrees with the Chrysomelidæ.

Curculionites optimus, sp. n. (Fig. 9.)

Elytra probably about 14 mm. long (11 mm. preserved), 6·5 mm. wide; nearly parallel-sided; humeral angle very distinct; ten rows of very distinct but irregularly placed punctures, the innermost row double and the outermost more or less so. The figure shows the arrangement of the rows.

Fig. 9.



Curculionites optimus, sp n.

Bartonian, Lower Bagshot Beds, Bournemouth. British Museum, 12869, with reverse.

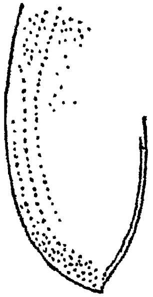
It was purchased from F. H. Butler in 1909, but came from the Nevil Jones collection.

Erotylites (gen. nov.) *wallacei*, sp. n. (Fig. 10.)

Elytra about 12·3 mm. long, 4·8 mm. broad, very convex, the apex broad, but with a sharp point; surface (abraded in middle) beset with fine distinct punctures, which run more or less in rows, as shown in the figure.

Bartonian, Lower Bagshot, Corfe Clay, Creech, between Corfe and Wareham, Dorset (*W. R. Brodie*, 14). British Museum, 19047. Purchased from the executors of H. S. Beckles in 1891.

Fig. 10.



Erotylites wallacei, sp. n.

The shape of the elytron is like that of *Cypherotylus aspersus*, Gorham (Erotylidæ). The general form is rather suggestive of Tenebrionidæ, but the apex is different.

Named after Dr. A. R. Wallace, in memory of a visit to Corfe in his company many years ago.

IV.—*New Species of African* Simuliidæ.

By A. W. J. Pomeroy, M.B.E.

[Plates III. & IV.]

In a previous paper* the writer pointed out the importance of the respiratory filaments of the pupa of *Simulium* as specific characters in distinguishing closely allied species, and an extended series of observations on African species confirms this opinion. In addition to the differences of the formation of the branching of the filaments, what may prove to be a very important clue to generic character has been observed, namely, the composition of the chitinous membrane of the filaments themselves. In some species the chitin is in the form of "scalloped" plates welded together, in others on hexagonal plates. In one species—*S. gilvipes*, Pomeroy—the membrane is covered with crescent-shaped nodules arranged in rows. In three species which have pupæ with four-branched filaments the resemblance in the arrangement of the chitin is remarkable, since one species (*S. bracteatum*, Coq.) is found in N. America, another (*S. aureum*, Fries) is a British species, and a third (*S. aureosimile*, Pomeroy) is found in the Kamerun, W. Africa. The writer has not made any histological investigation into the subject, and some considerable work needs to be done before any definite conclusion can be reached; but from superficial observation under a low power the characters seem to be too important to be overlooked.

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* Pomeroy, Bull. U.S. Dep. Agric. no. 329, Professional Paper, March 6, 1916, p. 24.

In the following descriptions of new species the pupæ have been correlated with the adults, by dissecting adult males which were almost ready to emerge from the pupal skin and comparing their genitalia with those of specimens bred in the streams at the same time and place.

Simulium cervicornutum, sp. n.

(Pl. III. fig. 3; Pl. IV. fig. 3.)

Male.—Length 1·5 mm.

Antennæ black, covered with a short greyish pubescence. *Thorax* velvet-black, covered with thick golden pubescence, in freshly emerged specimens entirely so. *Pleuræ* brown, lacking the patch of soft hairs. *Wings* hyaline, veins brown, radius unforked. *Abdomen* velvet-black, first segment with a fringe of dark purple-brown hairs; a diagonal perlaceous stripe on each side of the abdomen across the fifth, sixth, and seventh segments, rather more iridescent blue in some lights. *Legs*: front legs, coxæ dark brown; femora, apical ends dark purple-brown, remainder covered with shining light yellow hairs; tibiæ, apical third dark purple-brown, remainder covered with light yellow hairs; tarsi almost black. Hind legs: coxæ dark purple-brown; femora dark purple-brown; tibiæ, basal third covered with light shining yellow hair; tarsi purple-black, second tarsal joint with excision near base. *Genitalia*: basal pieces large; claspers about one-third the length of basal piece, having one finger-like process at the apex; anal plates, the lateral plates very long, exceeding the length of the claspers, with a few short bristles at the apex, the centre plate large; adminiculum rather broad, with a fringe of short hairs and some very irregular short spines at the apex of the trough; arms, the arms end mesally with a pair of spines, the outer one very long, the inner very short.

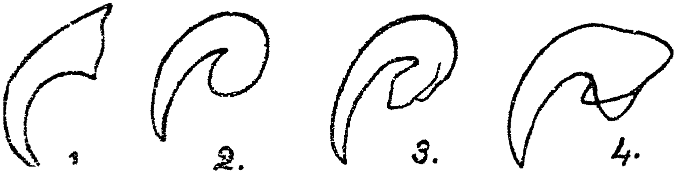
Hab. Quick-flowing mountain-streams, obtained by rearing from pupa.

Loc. Bangan, Kamerun, W. Africa, 14. 2. 1916. Altitude 2200 metres.

Type in the British Museum.

Female.—Length 1·7 mm.

Frons silver-grey. *Antennæ* brown with grey dusting, the two basal joints yellow. *Thorax* lustrous black, covered with strong golden pubescence. *Pleuræ* fuscous and lacking the patch of soft hairs. *Wings* hyaline, radius unforked. *Abdomen*: basal segment with fringe of long yellow hairs; second, third, and fourth segments with long golden hairs dorsally and laterally, the last four segments shining purple-black, with sparse black hairs and bristles. *Legs*: front legs, coxæ dark brown, with shiny masses of yellow hair; femora dark, with thick shining pale yellow hair on the apical half, silvery in some lights; tibiæ yellow, dark brown on apical fourth; tarsi very dark brown, almost black. Hind legs: coxæ dark brown; femora dark brown; tibiæ hairy, basal half shining yellow, apical half dark purple-brown; first tarsal joint yellow, but black at apex; second tarsal joint with marked excision near base; second, third, fourth, and fifth tarsal joints all purple-black. Claws with a large blunt tooth projecting from the base similar to *S. latipes*, Meig.



Hind claws of *Simulium*, ♀.

Fig. 1.—*Simulium medusæformis*, sp. n. Hind claw of female.
Fig. 2.—*Simulium cervicornutum*, sp. n.
Fig. 3.—*Simulium aureosimile*, sp. n.
Fig. 4.—*Simulium gilvipes*, sp. n.

Hab. Not found biting. Bred from pupa in swift mountain-stream.

Loc. Bangan, Kamerun, W. Africa, 14. 2. 1916. Altitude 2200 metres.

Paratype in British Museum.

Pupa.—Pupal filaments shaped like the antlers of an elk. The filaments arise from the base in three main branches;

the first branch divides dorsad into three short branches progressively longer; the second main branch divides dorsad into four, the first very short, the remainder progressively longer; the third main branch divides into two.

The pupa was determined from the genitalia and legs of the adult male, dissected from the pupa and compared with the type.

Simulium gilvipes, sp. n.
(Pl. III. fig. 5; Pl. IV. fig. 1.)

Male.—Length 2·4 mm.

Antennæ entirely dark brown, with greyish pubescence, the two basal joints somewhat paler. *Thorax* velvet-black, covered with thick light golden pubescence. *Pleuræ* light grey-brown, with patch of soft hairs near spiracle. *Wings*: hyaline veins brownish yellow, radius unforked. *Abdomen* velvet-black, covered with golden pubescence; first segment with fringe of long yellow hair, golden at base, pale at apex. *Legs*: front legs, coxæ very dark brown; femora dark brown at base, middle light yellow, brown at apex; tibiæ brown at apex, middle yellow covered with light golden pubescence, apex dark brown; tarsi, all tarsal joints very dark brown, last three almost black. Hind legs: coxæ brown; femora very yellow, with golden pubescence, apex dark brown; tibiæ, basal third yellow, apical two-thirds dark brown; tarsi almost black, the second tarsal joint with excision near base. *Genitalia*: basal pieces large; claspers less than the length of the basal pieces, blunt at apex, with single finger-like process; the ends usually turned over mesally; anal plates, side-pieces very small and very constricted inwardly at apices, bearing five to six stout bristles arising from very distinct nodules, centre plate small and denude of bristles; adminiculum very broad, with a fringe of weak hairs along the lower portion of pouch; arms very chitinous, ending mesially in two groups of strong black spines, the main spinal process very serrated outwardly.

Hab. Quick-flowing mountain-streams: obtained from pupa attached to rocks.

Loc. Bangan, Kamerun, W. Africa, 14. 2. 1916. Altitude 2200 metres.

Type in British Museum.

Female.—Length 2·6–7 mm.

Head: frons covered with silver pubescence; face silver-grey; antennæ dark brown with grey pubescence, first two joints pale yellow, third joint pale yellow at base. *Thorax* dull purple-black, covered with golden pubescence. *Pleuræ* brown-grey with patch of soft silky hair near spiracle. *Wings* hyaline, veins yellowish, radius unforked. *Abdomen* dull purple-black, covered with rather brassy pubescence, the seventh and eighth tergites rather bare and shiny, the fringe of hair on the first segment distinctly short, almost absent dorsally. *Legs*: front legs, coxæ brown; femora yellow, apex brown; tibiæ, basal two-thirds yellow, remainder dark brown; tarsi very dark, almost black. Hind legs: coxæ light brown; femora golden yellow, covered with brassy pubescence, apex black; tibiæ, basal two-thirds yellow, remainder dark brown; tarsi, first tarsal joint—basal third yellow, two-thirds covered with yellow pubescence, remainder of tarsal joints black. The second tarsal joint with excision near base; hind claws with tooth at base as in *S. ornatum*.

Hab. Not found biting; bred from pupæ in quick-flowing mountain stream.

Loc. Bangan, Kamerun, W. Africa, 14. 2. 1916. Alt. 2200 metres.

Paratype in British Museum.

Pupa.—The pupal filaments consist of fourteen branches arising from seven main stems and branching dichotomously a short distance from the base. The filaments are very strong in appearance, very dark and quite black at the apices, which are sharp-pointed and very chitinous. Under a high power the outer wall is seen to be covered with crescent-shaped nodules, which are arranged in rows over the entire surface. The pupa is described from specimens containing adult males dissected out and compared with type. They were also collected from the same locality on the same date.

Simulium medusæformis, sp. n.
(Pl. III. fig. 6; Pl. IV. fig. 2.)

Male.—Length 2 mm.

Antennæ black, covered with fine short grey pubescence, the two basal segments dirty yellow. *Thorax* velvet-black covered with thick light golden pubescence (in the type-specimen some of the pubescence has been rubbed off), especially thick at the sides. *Pleuræ* brown with silver sheen, lacking the patch of soft hairs near the spiracle. *Wings* hyaline, radius unforked. *Abdomen* velvet-black, first segment with long fringe of golden-brown hairs, a diagonal broad patch of iridescent silver-grey on the sides about the fifth and sixth segments; a fringe of long shining pale yellow hairs arises from the margins of the ventral sclerites, covering the sides of the abdomen on the first five segments; the ventral surface of the abdomen brown, with blue-grey iridescence. *Legs*: front legs, coxæ dark purple-brown; femora dark purple-brown just at apex covered with light yellow pubescence; tibiæ, dark brown front, basal two-thirds covered with shining silver pubescence; tarsi all black. Hind legs: coxæ black; femora purple-black; tibiæ, basal third covered with shining golden-yellow hair, remainder purple-black; tarsi, black first tarsal joint paler in middle, second joint with excision near base. *Genitalia*: basal pieces large; claspers large, rather tapering, with two finger-like processes at apex; anal plates, side-pieces small, with very few strong bristles; centre plate small with no bristles; adminiculum rather oblong with peculiar rows of stout spines running diagonally mesad across the lower end of pouch; arms strongly chitinous, ending mesally in two groups of very strong black spines, surrounded by a spiny membrane.

Female.—Length 2·3 mm.

Head: frons and face silver-grey; antennæ black with fine short silver pubescence, the two basal segments pale yellow. *Thorax* dark greenish black covered with golden pubescence, silver pubescence laterad on the shoulders. *Pleuræ* brown-grey pollinose, lacking the patch of solf hair on the membranous patch near spiracle. *Abdomen* black, heavily covered with long thick matted golden pubescence, which turns silver at the sides, first segment with a fringe of long pale hairs. *Legs*: front legs, coxæ black, femora black, front covered slightly with silver pubescence; tibiæ, basal two-thirds silver, apical third black; tarsi entirely black; hind legs, coxæ black, femora and tibiæ purple-black with silver pubescence; tarsi, first tarsal joint black at point of base, following two-thirds yellow, devoid of pubescence, black at point of apex, remainder of tarsi black; second tarsal joint with excision at base; claws simple.

Type-locality. Bangan, Kamerun, W. Africa, 2. 14. 1916. Alt. 2200 metres.

Hab. Bred from pupæ in swift-flowing mountain streams. Not found biting.

Paratypes in British Museum.

Loc. Top of Table Bay, Capetown, S. Africa. Specimens of pupæ obtained Dec. 7, 1912, by K. H. Barnard in Brit. Museum.

One male dissected from pupa shows the same male genitalia as type.

Pupa.—Pupal filaments with unique secondary filaments arising from main trunks. The main branches are as follows :—first main branch rather weak, consisting of four long filaments arising dorsally from the stem at intervals ; the remaining branches consist of four very stout finger-like processes, very dark in colour, with secondary filaments of a pale colour arising from them as follows :—from first finger two long filaments arise together from the base, about halfway up towards the apex a single long filament arises, and near the apex another long filament, making four secondary filaments in all ; from the second finger two filaments arise from the base, a third about halfway up, a fourth two-thirds and a fifth a short distance from the apex ; from the third finger only two filaments arise, one about two-thirds up and the other a short distance from the apex ; the last finger is not so thick as the preceding and is devoid of secondary filaments. Pupa described from specimens containing male adults dissected out and compared with type. The pupæ were also collected from the same locality and on the same date as adult type.

Simulium aureosimile, sp. n.
(Pl. III. fig. 1 ; Pl. IV. fig. 4.)

Male.—Antennæ brown. *Thorax* thickly covered with rich red-golden pubescence. *Pleuræ* brown, lacking patch of soft hair. *Wings* : radius unforked. *Legs* : front legs, coxæ pale yellow ; femora pale yellow covered with light golden hair ; tibiæ, basal two-thirds yellow, apical third brown ; tarsi all black. Hind legs : coxæ black ; femora, basal two-thirds yellow, apex black ; tibiæ, basal two-thirds yellow, apex black ; tarsi black, second tarsal joint with excision at base. *Genitalia* : basal pieces large ; claspers less than length of basal pieces with single finger-like process at apex of clasper ; anal plates not as large as claspers, with 18–20 strong bristles at apex ; centre plate rather small, devoid of bristles ; adminiculum very broad ; the pouch very narrow, constricted, with many small bristles ; arms end mesially in a single very prominent spine divided and thickened at base.

Hab. Bred from pupæ found in slow-moving stream. The pupæ were attached to grass-blades and vegetation.

Loc. Baliben, Kamerun, W. Africa, 10. 1. 1916.

Type in British Museum. Described from a single adult and some specimens dissected from pupa.

Female.—Thorax dull black, sparsely covered with light golden pubescence. *Pleuræ*. brown, lacking the patch of soft hairs. *Wings* : radius unforked. *Abdomen* dull brown.

Legs: front legs black with traces of pubescence, coxæ and femora yellow; tibiæ, basal two-thirds yellow, apical third black; tarsi all black. Hind legs: coxæ black; femora pale yellow, black at apex; tibiæ, basal third yellow, remainder black; tarsi all black; second tarsal joint with excision at at base; claws with very large projecting tooth at base.

Described from a single specimen reared from pupa and others dissected from pupa. The very conspicuous feature of the species is the yellowness of the upper part of the legs and the tooth-like process at the base of the claw.

Hab. Bred from pupa in slow-moving stream. Alt. 1000 metres. Not found biting.

Loc. Baliben, Kamerun, W. Africa, 10. 1. 1916.

Pupa.—The pupal filaments are four in number. The first two branches arise from the main stem near the base. The third branch divides dichotomously a short distance from the base. The filaments are very similar to those of *S. aureum*, Fries, and to *S. bracteatum*, Coq., but differ in the way they arise from the main stem. The pupa were determined from specimens containing male adults dissected out and compared with type.

Simulium unicornutum, sp. n. (Pl. III. fig. 2.)

Pupa.—Length 2–2·3 mm.

The pupal filaments are of a very unique character, consisting of a single horseshoe-shaped tube, rather more prominent cephalically, situated either side of the thorax. The filament, the cephalic portion of which is about 1 mm. in length, is attached at the usual position on the thorax and the tubular extension leading from the base is present. One of the specimens contained a male imago, but not sufficiently well developed to permit of an accurate description. The writer is of the opinion, however, that the very remarkable formation of the pupal filaments is sufficient to warrant its description as a new species.

Described from six specimens. Type in the British Museum.

Hab. Slow-moving mountain stream, attached to grass-blades.

Loc. Balibo, Kamerun, W. Africa, 12. 12. 1916. Altitude about 2000 metres.

Simulium damnosum, ♂, Theobald.
(Pl. III. fig. 4; Pl. IV. fig. 5.)

Male.—Length 2 mm.

Antennæ dark brown with grey pubescence. *Thorax*:

general colour lustrous slate-blue, with a broad black median stripe and a broad black stripe on either side concave outwardly, abbreviated toward basal margin. *Pleuræ* slate-grey, lacking patch of soft hair near prothoracic spiracle. *Abdomen* velvet-black, first segment with fringe of dark golden-brown hair, sides of abdomen with diagonal stripe of perlaceous blue. *Legs*: front legs, coxæ black; femora and tibiæ dark brown, with front of shining silver; tarsi very broad and black. Hind legs: coxæ and femora black; tibiæ black, basal third shining silver; tarsi, first tarsal joint shining silver, black at apex, remainder of tarsal joints black; second tarsal joint with excision near base. *Genitalia*: basal pieces about the same length as the claspers, having the apex of the outer lateral margin projecting very strongly, covered with very stout black bristles; claspers the same length as the basal pieces, with a single finger-like process at apex and rather pointed; anal plates—lateral pieces prominent, with several strong bristles, centre piece broad; adminiculum V-shaped, covered with very stout small triangular spines and a fringe of short hair at the apex of the pouch; arms—the arms end mesially in two masses of very black chitinous spines, the general appearance rather like a brush.

Pupa.—The filaments are rather pale and translucent in structure. They are composed of eight main lobes, bulbous and finger-like. The cephalic and caudal lobes very broad in the middle, pointed toward the apex. These two lobes are very often found split up the centre. The remaining six arise from the base of the main stem in pairs, and in some specimens a short broad secondary finger-like filament is present attached to one of the middle filaments, usually the first cephalic pair, about halfway up.

Described from specimens containing male imagos dissected out and compared with emerged adults, bred from the same locality and at the same time.

Hab. Swift-flowing mountain stream, attached to rocks in large masses.

Loc. Morogoro, Conquered Territory, E. Africa, 24. 11. 1917.

No previous description of the male or pupa has been published. The females bred from the same pupæ were compared with the type in the British Museum. The larva will be described in a later paper.

Specimens placed in the British Museum Collection.

EXPLANATION OF THE PLATES.

PLATE III.

Pupæ of *Simulium*.

Fig. 1. Respiratory filaments of the pupa of *Simulium aureosimile*, sp. n.
Fig. 2. Respiratory filaments and upper portion of the pupa of *Simulium unicornutum*, sp. n.
Fig. 3. *Simulium cervicornutum*, sp. n.
Fig. 4. *Simulium damnosum*, Theobald.
Fig. 5. *Simulium gilvipes*, sp. n.
Fig. 6. *Simulium medusæformis*, sp. n.

PLATE IV.

Genitalia of *Simulium*.

Fig. 1. *Simulium gilvipes*, sp. n.
Fig. 2. *Simulium medusæformis*, sp. n.
Fig. 3. *Simulium cervicornutum*, sp. n.
Fig. 4. *Simulium aureosimile*, sp. n.
Fig. 5. *Simulium damnosum*, Theobald.

V.—*British Oligocene Ants.* By HORACE ST. J. K. DONISTHORPE, F.Z.S., F.E.S.

[Plate V.]

IN my book on British ants (1915) I pointed out that two wing-impressions from the Lower Purbecks of Durdlestone Bay, considered by Westwood to belong to ants, and described by him in 1854 as *Formicium brodiei* and *Myrmicium heeri*, had been shown by Handlirsch to belong to saw-flies. I also stated that the remains of three genera—*Myrmica, Formica*, and *Camponotus*—were found in the Bembridge Limestone. The latter statement was made on the strength of a short note by P. B. Brodie on Tertiary fossil ants (1875) and a list of genera given in a paper by Dr. Henry Woodward (1879) on the authority of Mr. Frederick Smith of the British Museum.

At the time I was not aware that there were in the British Museum large collections of insects made by Brodie and E. J. A'Court Smith from the Oligocene of the Isle of Wight. At the request of the officers of the Geological Department I have since overhauled this collection, as well as a number of British fossil insects belonging to Mr. R. W. Hooley from the same source, and have arranged the specimens, as far as I am able, into their different families. Of the numbers attached to individual specimens, those following an "I" or "In" are register-numbers of the Geological Department of the British Museum. These numbers are all in one series, but the letter "I," being subject to misapprehension, was recently changed to "In." It so happens that all the specimens of the Brodie Collection (purchased in 1898) are denoted by numbers following "I," and that those of A'Court Smith Collection (though purchased in 1883) were registered later under numbers following "In." Specimens from Mr. Hooley's collection bear numbers following "H." The numbers in brackets, with or without a letter, are those of my working list.

A large proportion of these insects belong to the Formicidae, and I find that the so-called *Formica* and *Camponotus* are really species of *Oecophylla*. There are no specimens of *Myrmica*, but one ant, which has "*Myrmica*" written in pencil on the matrix, belongs to a new genus. Several specimens of a large wing marked "Wing of *Syrex*" are really the wings of a large species of *Oecophylla* described by Cockerell as *O. megarche*. For, on December 11th, 1915 (after the publication of my 'British Ants'), Professor Cockerell published a paper on "British Fossil Insects," and in it he described eight species of ants from the Oligocene of the Isle of Wight, based on duplicate material rejected from Brodie's Collection, and now preserved in the United States National Museum as part of the Lacoe Collection.

The locality in the Isle of Wight is Gurnet or Gurnard Bay (both spellings appear in the maps), which lies a little to the west of Cowes in the north of the island.

This deposit has been placed both in the Bembridge series =Middle Oligocene, and in the Osborne series, which is Lower Oligocene, as also are the deposits of Aix and the Baltic amber. Cockerell thinks, however, that the Gurnet Bay fossils indicate a more decidedly temperate climate, and consequently an age a little later than that of the Baltic amber. He suggests that there was, perhaps, a mud-spring, with heated waters, into which the insects fell, possibly overcome by gaseous emanations. The waters were not themselves poisonous, as fragments of rock carry also multitudes of a species of Phyllopod Crustacean, the *Branchipodites* described by Woodward (1879). Very many of the blocks I have examined exhibit these crustaceans, and some are marked in pencil "Branchiopode." Cockerell's contention with regard to the mud-spring is supported by the fact that nearly all the ants I have examined are winged, and were probably overcome by the vapours during their marriage flights.

The ants described by Cockerell are as follows:—

Ponera hypolitha, represented by the middle of a fore wing and one hind wing.
Dolichoderus britannicus, from a thorax with fore and hind wing; petiole and part of gaster; also a lateral section of a body.
—— *anglicus*, from the middle of a fore wing.
—— *oviyerus*, from the middle of a fore wing and part of body.
Leptothorax gurnetensis, from a nearly complete fore wing; also part of a larger one, described as a variety.
Oecophylla atavina, from part of body, fore and hind wing.
—— *perdita*, from a complete fore wing; another varying somewhat; also a small head and bit of thorax, and part of a fore wing, described as a male.
—— *megarche*, from a large fore wing, not quite complete; a hind wing; and head with large mandibles.

It is certainly unfortunate that Cockerell should have restricted his studies to a few relatively inferior specimens of these ants when such magnificent collections were available; but, of course, he could only make the best of such material as he had before him. His descriptions are based chiefly on measurements of the wings, their cells, and their veins, as these are almost all he had to go by. Now, as is well known, the wings of ants vary considerably, not only in the same species [Adolph (1880) examined a large number of male and female *Acanthomyops* (*Chthonolasius*) *umbratus*, Nyl., taken by him during a marriage flight, and found that over 80 per cent. of the specimens varied in the neuration of their wings], but even in the same individual—the cells and veins of the wings on one side of the insect not agreeing with those on the other. In *Oecophylla*, of which Cockerell had only five specimens, I have examined and measured over two hundred and forty-five specimens, and found them to differ in small measurements spreading over a large range. It would, of course, be absurd to give a separate name to each specimen that varied a little from the others; and it is almost impossible to decide where to draw the line or even which insects belong to Cockerell's species.

The specimens examined by me appear to belong to the following subfamilies:—

PONERINAE: 4 genera and 4 species.
DOLICHODERINAE: 1 genus and 4 species.
CAMPONOTINAE: 3 genera and 6 species.

It will thus be seen that I have been unable to detect any species belonging to the other two subfamilies—Dorylinae and Myrmicinae. As no species of the former subfamily occur in the Baltic amber, their absence is not surprising here; but that no species of the latter are present is very curious.

There are also some thirteen specimens of whose genera I am doubtful (some being only fragments), but in any case they do not belong with certainty to the two subfamilies just mentioned. These are numbered:—I. 8676, I. 8683, I. 8723, I. 8759, I. 9520, I. 9624, I. 9695, I. 10129, I. 10209, I. 10211; In. 17074; H. 127, and H. 334. Of these doubtful species I sent drawings of the six most distinct specimens to my friend Prof. Wheeler, and he has very kindly returned them to me with suggestions as follows:—(a. 18) I. 9695 *Cataulacus*?, ♀; I. 10211 *Dolichoderus*? (*Hypoclinea*?), ♀; I. 10209 *Liometopum*?, ♀; In. 17074 *Liometopum*?, ♀; H. 127 *Liometopum*?, ♀; H. 334 *Camponotus*?, ☿.

I do not propose to describe or figure these specimens, for the excellent reasons given by Wheeler. He writes (*in litt.*, 10th Dec., 1919):—"In the case of the Florissant fossils I shall not bother to describe or figure any specimens which are not quite clear. I pursued this course with the Baltic amber ants, of which I saw many that were indecipherable. If one actually refers obscure fossils to a particular genus without a query, they are dragged through the literature, and often produce great confusion later by giving the impression that certain genera were present in certain formations."

Subfamily *Ponerinae*, Le Peletier.

Tribe Ectatommini, Emery.

Genus Syntaphus, nov.

(*σύνταφος*, buried in the same grave.)

Diagnosis. An Ectatommine with a spine on the epinotum.
Genotype. *S. wheeleri.*

Syntaphus wheeleri, sp. n.

There are three pieces of rock which carry this species; two of them [I. 8744, I. 9936] exhibit the same specimen bisected by the splitting of the block, and show the head, thorax, and gaster, two legs, part of both antennæ, and a trace of the wings. On the third block [I. 9325] only the head, thorax, and half of the fore wing are present (Pl. V. fig. 2). The head is pointed at the posterior corners and the epinotum is spined. Part of the integument remains on the head and thorax in all three bits of rock, and the puncturation is coarse and rugose as in *Rhytidoponera*, *Stictoponera*, et al. The neuration of the wing is not very distinct, but a discoidal and second cubital cell are present. The junction between the thorax and gaster is not clear.

Long 5 mm.; head and thorax together 2·5 mm.; discoidal cell, which touches the second cubital cell, ·5 mm.; first cubital on discoidal ·3 mm.; second cubital at apex ·2 mm.

Oligocene at Gurnet Bay (*Brodie*).

Holotype, (a. 12), I. 8744 (Pl. V. fig. 1), and its counterpart (a. 13), I. 9936; paratype, (a. 11), I. 9325 (Pl. V. fig. 2). All in Brit. Mus.

Named after my friend Professor W. M. Wheeler, in recognition of his splendid work on the ants of the Baltic amber (1914).

Tribe PONERINI, Forel.

Genus EUPONERA, Forel.

Subgenus MESOPONERA, Emery.

Euponera (*Mesoponera*) *crawleyi*, sp. n.

Head, thorax, scale, gaster, one antenna, and traces of several legs present.

The head is triangular but indistinct in detail, the jaws and eyes not being indicated. The antenna is thickened towards the apex. The scale is high and narrower at the apex. The segments of the gaster fairly distinct, the first segment not strongly constricted.

Long 4 mm.

Oligocene at Gurnet Bay (*Brodie*).

Holotype, I. 8675, in Brit. Mus. (Pl. V. fig. 3).

I have placed this specimen in *Mesoponera* with considerable hesitation. It shows the lateral view and resembles specimens of this genus when seen in profile. I have named the species after my friend Mr. W. C. Crawley, in recognition of kind suggestions made by him concerning these difficult fossil ants.

Mesoponera is widely distributed, occurring in Africa, India, Australia, New Zealand, and America.

Genus PONERA, Latreille.

Ponera minuta, sp. n.

This small ant appears to me to be a *Ponera*. The head is raised in front, one fore and one hind wing are present;

but the neuration is quite indistinguishable. The pedicel is also indistinct. Traces of two legs are present.

Long 2 mm.; fore wing, long 2 mm.; hind wing, long 1·2 mm.; head, long ·5 mm.; thorax ·8 mm.; gaster ·7 mm.

Oligocene at Gurnet Bay (*Brodie*).

Holotype, (D. 1), I. 9734 in Brit. Mus. (Pl. V. fig. 4).

The *Ponera atavia* of the Baltic amber is said to be so similar to the recent *Ponera coarctata*, which occurs in Britain, that it is almost impossible to distinguish the two by any satisfactory characters. It is a larger insect than *P. minuta*, and measures about 3·6 mm. in length.

Genus EMPLASTUS, nov.

(ἐμπλαστός, imprinted.)

Diagnosis. A Ponerine with eyes small and close to the base of the mandibles, mandibles without teeth.

Genotype. *E. emeryi.*

Emplastus emeryi, sp. n.

This specimen shows the head, which is distinctly outlined, part of the thorax, part of one front wing, and traces of two legs.

The species comes near to *Myopias*, Roger, but the mandibles, which in that genus possess two small teeth, appear to be quite without teeth. The eyes are small and are placed close to the base of the mandibles. Head 2 mm. long and 2·3 mm. broad; transverso-medialis to basal corner of discoidal cell ·7 mm., discoidal cell, which touches the second cubital, 1 mm. long; second cubital cell, long 1·2 mm.; first cubital cell on discoidal ·8 mm.; basalis on first cubital ·3 mm.; second cubital cell at apex ·6 mm.

Oligocene at Gurnet Bay (*Hooley*).

Holotype, (a. 30), H. 129, in coll. Hooley (Pl. V. fig. 5).

Named in honour of Professor C. Emery, in recognition of his valuable work on the ants of the Sicilian amber (1891), and also for kindly pointing out to me the position of this and some other species of these fossil ants, from sketches I sent to him.

Only two species of *Myopias* are known; they occur in Ceylon and New Guinea respectively, and both are very rare.

Subfamily *DOLICHODERINAE*, Forel.

Tribe DOLICHODERINI, Emery.

Genus DOLICHODERUS, Lund.

The genus *Dolichoderus* is very widely distributed now, and occurs in Europe but not in Britain. Only one genus and species of the subfamily Dolichoderinae—*Tapinoma erraticum*, Latr.—is found in Britain to-day.

From the Baltic amber Wheeler mentions nine species of *Dolichoderus*, described from over five hundred and eighty specimens. Cockerell based three species on four specimens that he had before him from the Gurnet Bay deposit. The wings of the latter species differ as follows:—In *D. britannicus* the base of the radial cell is vertical and level with the end of the second cubital cell, the latter touching both the radial and the discoidal cells. In *D. anglicus* the second cubital cell is petiolate above, not reaching the radial, and also failing to reach the discoidal cell; I have not found any specimens of this species among my material. In *D. ovigerus* the base of the radial cell is vertical and practically level with the end of the second cubital cell; the latter touches the radial cell, but fails to reach the discoidal cell.

Dolichoderus britannicus, Cockerell (1915, p. 483).

There are fifteen specimens which I refer to this species, some being perfect wings, others complete bodies with parts of wings, and some only fragments of wings. One deälated female [(a. 22), I. 8695], which is very like Cockerell's figure of a lateral section, may be a small specimen of this species. In one large specimen [(a. 4), I. 10142] showing the lateral aspect, the outline and segments of the body are very clear, but only half the fore wing is present. One wing [(a. 23), H. 279] appears to be a variety, for, though it agrees in all other respects, the base of the radial cell is not level with the end of the second cubital cell, but comes before it. The measurements of the specimens are as follows:—Length 4·5–7 mm.; fore wing, long 6–6·5 mm.; transverso-medialis to basal corner of discoidal cell ·5–·7 mm.; basalis on first cubital ·3–·5 mm.; discoidal cell, long ·6–·8 mm.; second cubital cell, long ·7–1·5 mm.; radial cell, long 1·7–2 mm.; first cubital cell on discoidal ·5–·7 mm.; second cubital, width at apex ·3–·6 mm.

Oligocene at Gurnet Bay (*Brodie, A'Court Smith, and Hooley*).

Other specimens than those already mentioned are:—I. 8751, I. 9185, I. 10257, I. 10282, I. 10345, In. 17311, In. 17315, H. 114, H. 117, H. 262, H. 440, H. 497.

Dolichoderus ovigerus, Cockerell (1915, p. 484).

I consider the under-mentioned seven specimens to belong to this species. The range of measurements is as follows:—Length 4·5–6 mm.; fore wing, long 4·7–7 mm.; transversomedialis to basal corner of discoidal cell, long ·5–·7 mm.; basalis on first cubital cell ·3 mm.; discoidal cell, long ·6–·7 mm.; second cubital cell, long ·7–1 mm.; radial cell, long 1·2–1·8 mm.; first cubital cell on discoidal ·5–·6 mm.; second cubital cell at apex ·5–·6 mm.; base of second cubital to apical corner of discoidal ·3–·5 mm.

Oligocene at Gurnet Bay (*Brodie, A'Court Smith, and Hooley*).

I. 8861, I. 9198, I. 9347, I. 9354, I. 10348, In. 17274, H. 374.

Dolichoderus vectensis, sp. n.

The holotype shows outline of head, thorax, pedicel, and gaster, and one leg complete; trace of one fore wing showing discoidal cell; and a bit of one antenna.

Head pointed behind; epinotum with a spine; petiole large and pointed above; gaster with segments very distinct. Long 5–6 mm.; discoidal cell ·5 mm. long; first cubital on discoidal ·3 mm.

Oligocene at Gurnet Bay (*Brodie*).

Holotype, (a. 14), I. 9198, in Brit. Mus. (Pl. V. fig. 6).

Dolichoderus gurnetensis, sp. n.

In the unique specimen the head is separated from the body, but lies near it, and parts of a fore and hind wing are present. The thorax, scale, and gaster, two perfect legs, and parts of others can be seen.

The scale is large and high, the second cubital cell long, and the discoidal cell, which touches it, oblong. The base of the radial cell is slanting, not forming a straight line with the apex of the second cubital cell. The insect measures (with head) 5·5 mm. long; discoidal cell, long ·7 mm.; second cubital cell, long 1 mm.; first cubital on discoidal ·5 mm.; basalis on first cubital ·3 mm.; second cubital cell at apex ·5 mm.

Oligocene at Gurnet Bay (*Brodie*).

Holotype, (a. 17), I. 9755, in Brit. Mus. (Pl. V. fig. 7).

Subfamily *CAMPONOTINAE*, Forel.

Tribe FORMICINI, Forel.

Genus LEUCOTAPHUS, nov.

(*λευκός*, white, *τάφος*, tomb.)

Diagnosis. A Formicine with small head, very small discoidal cell, and long cubital cell. The wings are similar to those of *Formica* and *Acanthomyops*, but the discoidal cell is much smaller in proportion and the cubitus and radius veins join each other at the apex of the cubital cell—not a little before it, as is usually the case with *Formica* and the subgenera *Donisthorpea*, *Chthonolasius*, etc., of *Acanthomyops*.

Genotype. *Leptothorax gurnetensis*, Cockerell (1915).

Leucotaphus gurnetensis (Cockerell).

Syn. *Leptothorax gurnetensis*, Cockerell, 1915, p. 485, pl. lxv. figs. 4, 5.

Cockerell had before him only a not quite complete fore wing and part of another (which he considered a variety); and, as he himself writes, "This seems to be a *Leptothorax*, but I have only the wings to judge from." Unfortunately the fragments described by Cockerell will have to be the holotypes of this species and variety. Many of the specimens in the large series I have studied are nearly complete. Most of the winged specimens present the lateral aspect, others the dorsal, with the wings expanded. The wings are generally complete and the neuration very distinct. The species is, of course, a Camponotine, and not a Myrmicine, there being only a single joint to the pedicel, which bears a scale, as in *Formica*, *Acanthomyops*, etc.

L. gurnetensis closely resembles *Formica primitiva*, Heer (1850), from the Oeningen beds; but, apart from the generic distinction, it is much smaller.

I have seen some eight workers, nearly all of them being on the same piece of rock as winged specimens. The head is small, the scale distinct, and some parts of the legs are present, but the general outline is not very clear. The length is 2–2·7 mm. (Pl. V. fig. 8 *b*).

There is also what I consider to be the cocoon on the same block as a winged ant of this species [(b. 71), I. 9313 (Pl. V. fig. 8 *a*)]. It measures 3 mm. in length and is shaped as in *Acanthomyops*. Wheeler found cocoons with *Formica* and *Acanthomyops* in the Baltic amber.

The variation in measurements of these ants is as follows:—Length 2·5–3·5 mm.; fore wing, long 2·8–3·7 mm.; hind wing, long 1·5–2·5 mm.; upper end of transverso-medialis to lower end of basalis 1·5–2·5 mm.; lower side of discoidal cell ·2–·3 mm.; cubital cell, long ·7–1 mm.

There are several larger specimens which may be the females of this species, this sex being, on that view, larger than the male, as in some of the subgenera of *Acanthomyops*; some are deälated, others winged. One specimen [(b. 106), I. 10097)] is very perfect, showing well the segments of the thorax and gaster. It possesses the small head and discoidal cell of the smaller specimens, as well as a similar wing-neuration. Its measurements are:—Long 4·5 mm.; fore wing 4 mm.; hind wing 3 mm.; transverso-medialis to basalis ·6 mm.; discoidal cell, lower side ·3 mm.; cubital cell, long 1·1 mm.

A few specimens possess a larger discoidal cell, and agree with Cockerell's var. *a*; in specimen (b. 64), I. 9082, a female 4·5 mm. in length, the lower side of the discoidal cell is ·7 mm. long.

Oligocene at Gurnet Bay (*Brodie, A'Court Smith, and Hooley*).

Plesiotype, (b. 72), I. 9756 (Pl. V. fig. 8).

Ergatotype, (b. 56), I. 9744. Other workers, (b. 101), I. 10248; (b. 104), I. 9688; (b. 107), In. 17250; (b. 108), I. 8722; (b. 109), I. 9483; (b. 116), H. 168; (b. 117), H. 450.

Cockerell's var. *a* is represented by: (b. 7), I. 81026; (b. 15), In. 17202; (b. 11), In. 17298.

Other specimens:—

I.: 7286, 8539, 8677, 8678, 8681, 8684, 8698, 8719, 8724, 8728, 8735, 8736, 8737, 8740, 8759, 8764, 8765, 8889, 8927, 8972 (b. 105, b. 113), 8994, 8999, 9013, 9037, 9039, 9142, 9163, 9168, 9184, 9218, 9231, 9242, 9246, 9250, 9266, 9275, 9281, 9285, 9295, 9299, 9332, 9351, 9353, 9356, 9369, 9386, 9406, 9511, 9526, 9578, 9584, 9593, 9632, 9653, 9667, 9677, 9718, 9723, 9746, 9751, 9762, 9763, 9774, 9778, 9796 (Pl. V. fig. 9), 9823, 9847, 9869, 9889, 9900, 9908, 9918, 9930, 9958, 9996, 10005, 10006, 10018, 10010, 10103, 10120, 10123, 10127, 10185, 10215, 10256, 10258, 10265, 10341.

In.: 17066, 17084, 17106, 17175, 17181, 17203, 17213, 17227, 17250, 17281, 17318, 19602.

H.: 139, 189, 377.

Leucotaphus cockerelli, sp. n.

Two large specimens agree in structure and neuration with the genotype. They possess the small head, small discoidal cell, long cubital cell, etc., but are considerably larger, and it is, perhaps, best to treat them as a distinct species. One [I. 9028] is a deälated female, 5·5 mm. long; the other [I. 8517] is winged, and is 6 mm. long; fore wing 6 mm.; hind wing 3·5 mm. Although the neuration of the wing is clear enough to show its correspondence with that of *L. gurnetensis*, it is too indistinct for exact measurement.

Oligocene at Gurnet Bay (*Brodie*).
Holotype, (b. 115), I. 8517 (Pl. V. fig. 10).
Paratype, (b. 64), I. 9028.

Tribe OECOPHYLLINI, Forel.

Genus OECOPHYLLA, F. Smith.

This genus occurs at the present day in Africa, India (with Ceylon etc.), Australia, and New Guinea. These ants are famous on account of their interesting habit of employing their larvæ to sew together the leaves and other materials of which their nests are constructed.

Wheeler (1914), in his most important work on the ants of the Baltic amber, mentions two species—*O. brischkei*, Mayr, of which he had examined thirty-six workers and two males (which he describes), and *O. brevinodis*, newly described from a single worker. Emery (1891) described the worker of another species—*O. sicula*—from the Sicilian amber, and Cockerell based three more species on five specimens from the Isle of Wight deposit.

Oecophylla megarche, Cockerell (1915, p. 486).

Of the large series of *Oecophylla* I have seen from the Gurnet Bay locality, forty-two specimens appear to belong to this species.

Cockerell gives the length of the fore wing as 20·5 mm.; but his specimen, which unfortunately has to be the holotype, is not complete. In the complete wings before me (some nine specimens) the length varies from 22 to 24·5 mm., the other measurements of the cells and veins varying in proportion. The upper section of the basalis is longer than that of the lower, and the two sections are in a straight line. The length of the hind wing described by Cockerell is 16 mm.; that of three hind wings which I have examined is 18 mm. It may be worth while to mention that the length of the fore wing in the modern *Oecophylla smaragdina* is about 16 mm. and that of the hind wing 10 mm.

Cockerell describes the head of a female with long massive jaws and part of the body. I have seen three deälated females: one specimen [I. 8702] exhibits the head with massive jaws, outline of thorax, petiole and gaster, and part of the femora of all six legs. A number of eggs are visible within the gaster. Its measurements are as follows:—Length 12·5 mm.; petiole 1·2 mm.; gaster, long 3·5 mm., broad 3 mm.; head, long 3 mm., broad 2·5 mm. The second specimen [I. 8711] possesses the left intermediate leg complete. It measures:—Length 12·7 mm.; head, long 3 mm., broad 2·6 mm.; petiole 1·5 mm.; gaster, long 3·5 mm., broad 4 mm. The third specimen [I. 9335] consists only of a thorax, petiole, and part of the gaster with some of the segments visible, and a bit of one femur. A specimen of part of a winged female [In. 17313] shows the head with large jaws and eyes, thorax with scutellum fairly distinct, and traces of three wings, the petiole, and the two anterior legs. The head is 3 mm. long and 2·7 mm. broad.

Oligocene at Gurnet Bay (*Brodie, A'Court Smith, Hooley*).

Plesiotype (wing) (no. 63), I. 8882 (Pl. V. fig. 11); plesiotype (deälated ♀) (no. 6), I. 8702 (Pl. V. fig. 12). Other specimens:—

I.: 8335, 8705, 8708, 8711, 8797, 8806, 9151, 9548, 9655, 10368, 10386.

In.: 17085, 17115, 17233, 17241, 17243, 17273, 17313, 17342, 17416, 17418, 17419, 17420.

H.: 27 *a*, 85, 97, 98, 99, 100, 102, 103, 111, 113, 167, 327, 370, 392, 420, 483.

On one fragment of rock [(68), I. 9613], bearing remains of *Oecophylla* wings, are several specimens of what appear to be workers. These are indistinct, but show the outline of a head, thorax, petiole and gaster, and some legs, which may well belong to *Oecophylla*. These ants are small, being only 3·5 mm. in length (the smallest worker of *O. smaragdina* in my collection measures 4 mm.), and I am quite unable to decide to which of Cockerell's other species they should be referred. I should say they were too small for *O. megarche*.

I have been quite unable to satisfy myself to which of Cockerell's other species the rest of the two hundred and forty-five specimens of *Oecophylla* belong. They are all smaller than specimens of *O. megarche*. A chart of the measurements shows that they vary in every possible way—in size, size of wings, and all other measurements. Nor does it appear to me that any good purpose would be served by creating a number of new species, which would probably embrace or overlap Cockerell's *O. atavina* and *O. perdita*.

Tribe CAMPONOTINI, Forel.

Genus CAMPONOTUS, Mayr.

Subgenus COLOBOPSIS, Mayr.

Camponotus (*Colobopsis*) *brodiei*, sp. n.

One specimen appears to me to be a soldier of *Colobopsis*, on account of the square anterior truncation of its head. The head, thorax, scale, and gaster, three legs, and a part of one antenna are present.

Length 4·5 mm.; head, long 1·7 mm.; breadth in middle of head 1·3 mm., at apex ·7 mm.

Oligocene at Gurnet Bay (*Brodie*).

Holotype, (D. 2), I. 9551, on same block as an *Oecophylla*; in Brit. Mus. (Pl. V. fig. 13).

Wheeler (1914) described a new genus *Dryomyrmex*, with two species, from the Baltic amber. At first he regarded them as belonging to the subgenus *Colobopsis* of *Camponotus*, but he found that the different structure of the antennæ and frontal carinæ placed them near *Aphomyrmex*. Such characters as these are unfortunately not visible in specimens imbedded in rock. He points out that the structure of the head etc. shows that the ants lived in cavities of twigs, in oak-galls, or in abandoned insect-galleries in solid wood, like the species of *Colobopsis*.

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EXPLANATION OF PLATE V.

The figures are drawn by Miss O. F. Tassart, with guidance from the author's sketches and under his direction.

The magnification given is linear and is only approximate.

Fig. 1.	*Syntaphus wheeleri*, sp. n., holotype.	I. 8744.	× 7·7.
Fig. 2.	Ditto, paratype.	I. 9325.	× 7·7.
Fig. 3.	*Euponera* (*Mesoponera*) *crawleyi*, sp. n., holotype.	I. 8675.	× 7·3.
Fig. 4.	*Ponera minuta*, sp. n., holotype.	I. 9734.	× 5·4.
Fig. 5.	*Emplastus emeryi*, sp. n., holotype.	II. 129.	× 4·2.
Fig. 6.	*Dolichoderus vectensis*, sp. n., holotype.	I. 9198.	× 5·1.
Fig. 7.	*Dolichoderus gurnetensis*, sp. n., holotype.	I. 9755.	× 7.
Fig. 8.	*Leucotaphus gurnetensis* (Cockerell).	I. 9756.	× 7·3.
Fig 8*a*.	Ditto, cocoon.	I. 9343.	× 2·8.
Fig. 8*b*.	Ditto, worker.	I. 9744.	× 4·5.
Fig. 9.	Ditto.	I. 9796.	× 7·3.
Fig. 10.	*Leucotaphus cockerelli*, sp. n.	I. 8517.	× 5·3.
Fig. 11.	*Oecophylla megarche*, Cockerell, wing.	I. 8882.	× 2·7.
Fig. 12.	Ditto, deälated female.	I. 8702.	× 4.
Fig. 13.	*Camponotus* (*Colobopsis*) *brodiei*, sp. n., holotype.	I. 9551.	× 6.

VI.—*On a Collection of Mammals from the Dinka Country, Bahr-el-Djebel.* By MARTIN A. C. HINTON and P. S. KERSHAW.

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IN 1918 and 1919 Major J. Stevenson Hamilton made a collection of mammals from the banks of the Bahr-el-Djebel, northwards from Lado. He presented his specimens to the Wellcome Research Laboratory at Khartoum, and they have now been sent to the British Museum for determination. The collection is one of considerable interest, and it materially increases our knowledge of the fauna of this region.

1. *Eidolon helvum*, Kerr.

♂. 181 (immature). Duk.
Dinka name "*Alik*."

2. *Nycteris hispida*, Schreb.

♂. 79, 83, 84, 85, 86, 87, 88, 89; ♀. 80, 81, 82. Kongor, 60 miles north of Bor.

♂. 95, 96, 97. Duk Fagwil, Dinka Country.

♂. 157, 158. Duk Fadiat.

♂. 91; ♀. 90, 92. Dinka Country, 40 miles north of Bor.

Dinka name "*Alik.*"

3. *Rhinolophus fumigatus eloquens*, K. Andersen.

♀. 119. Yei, Lado Enclave, 70 miles west of Nile and 150 miles from Lake Albert.

4. *Lavia frons affinis*, And. & Wrought.

♂. 56, 57, 60; ♀. 58, 61. Mongalla.
♂. 145. Duk.
♀. 190. Conglei.
Dinka name "*Alik.*"

Generally found in trees, but occasionally in huts. The contents of the stomachs of two specimens were examined, and found to consist of mosquitos and small flies.

5. *Chærephon pumilus*, Cretzsch.

♂. 23, 35, 50, 51, 55, 65; ♀. 9 *a*, 52, 53, 63. Mongalla.
♂. 70, 71, 111, 114; ♀. 112, 113. Bor.
♂. 9 *b* (mummy).
All caught in houses or huts.

6. *Taphozous hamiltoni*, Thos.

♀. 118 (the type). Mongalla.

This species was described from this collection by Mr. Thomas last January (*supra*, p. 142).

7. *Crocidura nyansæ*, Neumann.

♂. 72, 125, 127, 138, 143; ♀. 136, 146, 185. Bor.
♀. 44. Mongalla.

The material is not sufficient to allow of more precise determination.

8. *Crocidura sericea*, Sund.

♀. 18. Badigeru Swamp, east of Mongalla.
♀. 25, 37. Mongalla.
♂. 171, 179; ♀. 170, 177. Duk.
Dinka name "*Yĕŭn.*"

9. *Crocidura turba nilotica*, Heller.

♂. 17. Badigeru Swamp, east of Mongalla.
♂. 29. Mongalla.

10. *Crocidura lutrella*, Heller.

♂. 2, 66. Mongalla.

11. *Genetta stuhlmanni*, Matsch.

♂. 156; ♀. 150. Duk.
♀. 99. Duk Fagwil.
♀. 75. Bor.
Dinka name "*Angong*;" Nuer name "*Ngong*."

12. *Genetta æquatorialis*, Heugl.

♂. 39, 73. Mongalla.
♀. 41. Luri River, 10 miles west of Lado.

13. *Civettictis civetta*, Schreb.

183. Bor.

14. *Herpestes ichneumon*, Linn.

♂. 54, 64. Mongalla.
♀. 149, 151, 152. Duk.
Nuer name "*Lunchi*."

It is possible that these should be referred to Osgood's *H. i. funestus*; the following are the dental measurements of no. 64:—canine to $\underline{m.\,3}$ 34·2 mm; $\underline{p.\,2}$ 5·3 × 2·8; $\underline{p.\,4}$ 10·3; $\underline{m.\,1}$ 8·7; $\overline{m.\,2}$ 3·8 × 3.

15. *Herpestes sanguineus*, Rüpp.

♂. 26. Mongalla.

16. *Ichneumia albicauda leucura*, Hemp. & Ehr.

♂. 128; ♀. 129. Bor.
A skin collected at Khartoum by Mr. H. H. King.

The Khartoum specimen is small, light-coloured, with a white tail. Those from Bor are large, dark-coloured, with black tails; their cranial and dental measurements are as follows:—

	Condylo-basal length.	Canine to $\underline{m.\,3}$.	$\underline{p.\,4}$.	$\underline{m.\,1}$.	$\overline{m.\,2}$.
128....	105	41	9·8	8·4	6·6 × 4·1 mm.
129....	101·8	39·2	9·2	8·1	6·3 × 3·9

17. *Mungos gotneh*, Fitz.

♂. 93. Bor.
♀. 182. North of Bor.

Dinka name "*Ador.*"

Pocock (P. Z. S. 1916, p. 349) has shown that the African banded mongooses are not congeneric with *Crossarchus*, and he therefore revived Gray's *Ariela* for their reception. But quite recently Allen (Journ. of Mamm. i. p. 27) has recalled the fact that the genus *Mungos* was primarily established upon an African banded mongoose. Therefore *Mungos* becomes the generic name of the animal called in recent years "*Crossarchus fasciatus*" and its allies; while the time-honoured *Herpestes* is restored to the true mongooses.

18. *Canis thooides*, Hiltz.

♀. 109. Bor.

For the determination of this specimen we are indebted to Mr. Thomas. It has been transferred to the National Collection by the Wellcome Research Laboratory, and it is a noteworthy accession, because this interesting Jackal was previously unrepresented in the British Museum.

19. *Heliosciurus multicolor madogæ*, Heller.

2 *a*. A skin collected by Mr. J. H. Miller at Kajo Kaji, on the west bank of the Bahr-el-Djebel, 15 or 20 miles from the river and 60 miles south of Rejaf.

Practically topotypical.

20. *Taterona benvenuta*, sp. n.

♂. 47; ♀. 20, 21, 24, 27, 28, 33, 34, 48, 49. Mongalla.
♂. 94. 40 miles north of Bor.
♂. 98; ♀. 100. Duk Fagwil.
♂. 164, 168, 178, 180. Duk.
♀. 194. Lang.

Dinka name "*Ayom.*" Caught in grass and undergrowth.

The following specimens, presented by Mr. A. L. Butler to the British Museum, are also referable to this species:—

♂. 8. 7. 13. 3. Bor; collected by Dr. Wenyon.
♀ ad. and juv. 8. 4. 2. 20–21. Chak-chak, Bahr-el-Ghazal.

Hab.—Bahr-el-Djebel; ranging south to Lake Albert and west to the neighbourhood of Dem Zubeir, Bahr-el-Ghazal.

Type.—An adult female (B.M. 20.4.26.27; original no. 49) collected at Mongalla, Jan. 18, 1918, by Major J. Stevenson

Hamilton; presented to the British Museum by the Wellcome Research Laboratory.

Description.—This is a medium-sized sober-hued species, differing externally from *T. robusta* and its allies by having no tuft to the tail and in its skull by the more nearly orthodont incisors and truncated rostrum, the nasals ending almost flush with the anterior surfaces of the incisors instead of projecting noticeably beyond them.

Size medium (average of ten adults: head and body 138 mm.; tail 155; hind foot 32).

Tail clothed throughout with short stiff hairs (black or dark brown above, pure white below), which do not completely conceal the annulations on the upper surface. At the tip these hairs become a little longer and finer, projecting for 2 to 3 mm. beyond the last vertebra; but there is no pencil or dorsal fringe as in *robusta* or *macropus*.

Colour of upper surface much duller than in the species with fringed tails. Ground-colour near "clay-colour," much darkened by black hair-tips on top of head and along mid-dorsum; gradually brightening on flanks to dull buff. Underparts sharply contrasted, pure white. Feet and hands white above. Tail dusky above, dirty white below.

Skull.—With nearly orthodont, rather broad, shallowly grooved upper incisors. Anterior blades of premaxillæ, between incisors and nasals, little developed. Nasals relatively short, not projecting far in advance of anterior faces of incisors; occipito-nasal and nasal lengths respectively equal to 108–110 $^{\circ}/_{\circ}$ and 43–45 $^{\circ}/_{\circ}$ of condylo-incisive length; in *robusta* the corresponding dimensions are equal to 114–115 $^{\circ}/_{\circ}$ and 49–52 $^{\circ}/_{\circ}$. Brain-case relatively narrow and deep.

Dimensions of type and of no. 94 (an old ♂, in parentheses):—Head and body 169 (158) mm.; tail 175 (—); hind foot (on skins) 34 (35); ear 19 (21).

Skull: condylo-incisive length 37·2 (39·7); occipito-nasal length 41·1 (42·8); nasals 16·6×3·9 (17·8×3·8); zygomatic breadth 20·8 (—); interorbital breadth 6·1 (6·5); cranial width 16·8 (16·8); median occipital depth 10·9 (11·1); bullæ 11·6×6·8 (12×7); dental length 20·6 (22); molars (crowns) 6·3 (6·4).

Remarks.—One of us lately has been paying much attention to this difficult genus. In the countries bordering the Nile and in East Africa *Taterona* shows a tendency to split into two well-marked groups. In one of these groups the tail is fringed and the coloration usually bright or intense; and these external characters are correlated with protruding nasals, large premaxillary outgrowths, opisthodont incisors, and small cheek-teeth. In the other the tail has no fringe and the colour is dull, while the skull has a truncated rostrum, with short nasals and small premaxillary outgrowths, orthodont incisors, and large molars. *T. robusta* (including *murinus*, Sund.), *macropus*, *nigricauda*, and *mombasæ* are typical members of the first group; while *benvenuta*, *flavipes*, *soror*, and *liodon* (with its nearest allies) are representative of the second. In South Africa the distinction between the two groups seems to break down or is less marked. This may, however, be merely an appearance, for it is possible that one of the two groups may be missing from the country south of the Zambezi. If such be the case, the group actually present there must fill all the accommodation available for the genus; and therefore it would not tend to be specialized in either of the two directions as is necessitated elsewhere by competition. The absence of rivals weakens allegiance.

T. flavipes and *soror*, described from the banks of the Blue Nile by Mr. G. M. Allen, are clearly nearly related to *benvenuta*. In the absence of material from the Blue Nile we are unable to make a proper comparison; *flavipes* is, however, a considerably larger form than ours, while *soror* would seem to be smaller, brighter in colour, and to have relatively smaller bullæ.

We would take this opportunity to describe

21. *Taterona benvenuta lucia*, subsp. n.

Hab.—Musisi River, Lake Albert. Altitude 2400 feet.

Type.—An old female (B.M. 11. 12. 9. 34), collected with a male in February 1911, and presented to the British Museum by Mr. Gilbert Blaine.

This differs from the typical form of the Bahr-el-Djebel by its smaller size, shorter tail, and darker colour.

With regard to the difference in size, the hind foot measures 30–31 mm., instead of about 34 as in adults of the typical form; and the condylo-incisive length of the very old female skull is 37·8 instead of about 40 mm.

The tail is about equal to the length of the head and body, instead of being appreciably greater. The back is much more completely and extensively darkened by the black hair-tips than in true *benvenuta*.

Skull.—General form as in true *benvenuta*, but smaller and with relatively broader brain-case; incisors with still weaker grooves.

Dimensions of the type and ♂ (in parentheses):—Head and body 150 (151) mm.; tail 151 (152); hind foot 30 (31); ear 19 (21).

Skull: condylo-incisive length 37·8 (36·9); occipito-nasal length 40·7 (40·2); nasals 17·2×4·5 (16×4·1); zygomatic breadth 20·8 (20·3); interorbital breadth 6·8 (6·4); cranial width 17·1 (17·1); median occipital depth 10·7 (10·4); bullæ 11·3×6·7 (11·3×6·9); dental length 21·1 (20·6); molars (crowns) 6·3 (6·7).

22. *Taterillus emini*, Thos.

♀. 132. Aliab Country, west of Nile. Caught in forest near river.

23. *Cricetomys gambianus*, subsp.?

195. Loka, west of Rejaf.
No skull. One of the harsh-furred group.

24. *Rattus alghazal*, Wrought.

♀. 42. Luri River, 10 miles west of Lado.
♀. 43. Luaba, 2 miles west of Lado.

25. *Rattus* (*Mastomys*) sp.

♂. 159, 160, 161, 162, 165, 166, 167, 173, 175, 176; ♀. 154, 155, 163, 169, 172, 174. Duk.

♂. 77, 101, 102, 107, 110, 140, 184, 186; ♀. 74, 76, 105, 131, 144. Bor.

♂. 4, 13, 16 *a*, 31, 117; ♀. 15, 32. Mongalla.
♀. 133. Aliab Country, west of Nile, opposite Bor.
♀. 134. Kenisa.
♀. 141. Rengko.
♀. 148. Kongor.
♀. 40. Luri River, 10 miles west of Nile, near Lado.

Dinka name "*Lok*" (that given for 148 is "*Kun*"). Captured in or near villages.

26. *Grammomys macmillani gazellæ*, Thos.

♂. 36. Mongalla; captured in long grass.
♀. 139. Bor; captured in forest about 1 mile from river.

27. *Leggada bella* (subsp.?).

♂. 122. Kenisa, Bahr-el-Djebel.
♀. 120. Duk.
Caught in grass near forest.

These differ a good deal from each other and may represent distinct subspecies.

28. *Acomys wilsoni argillaceus*, subsp. n.

38. Mongalla.
♀. 108. Bor.

Type.—B.M. 20. 4. 26. 15, original no. 38. Collected 2nd June, 1918, by Major Stevenson Hamilton; presented to the National Collection by the Wellcome Research Laboratory.

Captured in scrub and undergrowth.

Size a little less than in *Acomys wilsoni*, Thos., from which it also differs in its less rufous colouring. Spines thick, annulated, their extreme tips being "seal-brown," succeeded by a broad band of "clay-colour," which is followed by "grey" (no. 6, Ridgway) to the base. General colour very similar to that of *A. w. ablutus*, Dollm., but lighter owing to the clay-coloured annulations being broader in our animal.

Skull very much as in *A. wilsoni*, conspicuously larger than in *A. w. ablutus*.

Dimensions of the type (measured in the flesh):—Head and body 76 mm.; tail 51; hind foot 12; ear 10.

Skull, type and no. 108 (in parentheses): condylo-incisive length 22·4 (23·2); occipito-nasal length 24·6 (—); zygomatic breadth 12·1 (12·1); interorbital constriction 4·5 (4·5); breadth of brain-case 11·1 (11·1); length of anterior palatal foramina 6 (5·7); dental length 11·8 (12); molars (crowns) 3·5 (3·8).

Remarks.—This member of the *wilsoni* group is geographically isolated, its nearest neighbours on the north and south being *A. witherbyi* and *A. hystrella*, from both of which it differs widely in size and colour.

29. *Arvicanthis abyssinicus rubescens*, Wr.

♂. 6, 7, 8, 959; ♀. 3, 5, 10, 11, 12, 13, 14, 30, 45, 46, 124. Mongalla.
♂. 103, 105, 123, 126; ♀. 104, 135, 137. Bor.

30. *Lemniscomys zebra*, Heugl.

♂. 16, 19. Badigeru Swamp, 20 miles east of Mongalla.
♂. 62. Mongalla.
♀. 121. Rejaf.

VII.—*The Species of* Pedetes *inhabiting Angola.*
By MARTIN A. C. HINTON.

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THE existence of a jumping hare in Southern Angola has long been known. Peters (P. Z. S. 1865, p. 400) referred an imperfect skin, collected by Dr. Welwitsch in the district of Golungo Alto, to *Pedetes caffer*; and later Bocage (Journ. Sci. math.-phys. nat. Lisboa, (2) no. v. (1890) p. 19) stated that "M. de Anchieta l'a rencontrée à Humbe, sur le bord du Cunene, où elle ne doit pas être rare, car notre voyageur nous a envoyé de cette localité trois individus adultes." No other information has been published about the Angolan springhaas, and no material has reached the British Museum hitherto.

Thanks to the kindness of Mr. E. Sanders, of the British Mission at Bihé, the National Collection has been enriched recently by the skins of two females, one of the skins being accompanied by a fine skull. These specimens were obtained at Cholinde, a place 20 miles N.E. of Bihé; they come, therefore, from a district far to the north of that which yielded the material mentioned by Peters and Bocage.

Mr. Sanders's specimens prove that the Angolan animal is a close relation of *P. caffer*, being, with the latter, sharply differentiated from the East-African *surdaster* by the characters of the skull. But in colour it is far darker than any of the subspecies of *P. caffer*, and the skull is of peculiarly long and narrow form. It must therefore be referred to a distinct species, which may be called

Pedetes angolæ, sp. n.

Type.—An adult female (B.M. 19. 12. 19. 1) collected at Cholinde, 20 miles N.E. of Bihé, Angola, and presented to the British Museum by Mr. E. Sanders.

In size, external characters, and skull (as regards the form of the anterior palatal region and the development of the internal ear) closely agreeing with *P. caffer*, differing from the latter chiefly in its darker colour, harsher fur, and longer and narrower skull.

Fur noticeably harsher than in *caffer*. General colour of upper parts darker, between dull "tawny ochraceous" and "Sudan brown," darkened on top of muzzle and head by numerous black hair-tips, and dulled on the back by the partly visible slaty bases of the hairs. A light area invades the flank-colour from below just in front of the thighs, as in *caffer*. Under parts less pure white than in *caffer*, the fur noticeably thinner and harsher. Hands and feet as in *caffer*. Colour of upper surface of proximal three-fourths of tail pure, not darkened by dark hair-tips, the tint being between dull "tawny ochraceous" and "Sudan brown"; lower surface of same region of tail dirty white, tinged with brown, many of the hairs towards the root of the tail having slaty bases. Terminal fourth of tail black above and below.

Skull longer and relatively narrower than in *P. caffer*, the zygomatic arches being considerably less expanded; zygomatic and greatest squamosal breadths respectively equal to 69·6 °/₀ and 56 °/₀ of the condylo-basal length; in *caffer* (fourteen skulls belonging to three subspecies examined) the zygomatic breadth varies between 72·3 and 78·3 °/₀, the greatest squamosal breadth between 56·7 and 63·2 °/₀ of the condylo-basal length. The petro-mastoid is rather more inflated than in *caffer*, for the least distance between the bullæ upon the upper surface of the skull amounts to no more than 26·6 °/₀ of the greatest squamosal breadth; the average value of this dimension in all forms of *caffer* is 31·7 °/₀, the range being 28·5 to 34·7 °/₀. The anterior border of the interparietal is but slightly convex, almost straight, not thrown forwards as a strong process intercalated between the parietals, as is the case in *caffer* and *surdaster*. On the ventral surface the lateral flanges of the basioccipital, abutting against the median surfaces of the auditory bullæ, are much less developed than in *caffer*; there are two small foramina—one behind the other—in the middle line of the basisphenoid, and a larger irregular vacuity in the basioccipital. The fossa containing the anterior palatal foramina is as deep and extensive as in *caffer*. In profile the maxillary portion of the outer wall of the infraorbital canal is considerably broader antero-posteriorly than in any other *Pedetes* before me. In *caffer* and in *surdaster* the hinder part of the jugal bears a well-marked impression for the origin of the "postero-superior almost horizontal" portion of the *masseter lateralis* muscle (figured by Tullberg, Taf. x. fig. 8), and the ventral border of the bone is produced downwards and backwards to form a well-marked angular process; in *angolæ* the muscular impression in question is very feebly developed, while the angular process is lacking. The cheek-teeth offer no tangible differences. The upper incisors are a little less opisthodont than in *caffer*, but, owing to the irregular form of the incisive alveolus in this genus, the incisive angle is difficult to measure satisfactorily.

Dimensions of the skull *.—Condylo-basal length 80·8 mm.; occipito-nasal length 92·4; zygomatic breadth 56·1; greatest squamosal breadth 45·2: least distance between periotics on dorsal surface 12; nasals 35·3 × 21·5; dental length 50·6: cheek-teeth at grinding-surface 17·4.

VIII.—*Three new Fishes from the Tanganyika Territory.*

By C. TATE REGAN, F.R.S.

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THE fishes described below form part of a collection made at Morogoro, Tanganyika Territory, by Mr. A. Loveridge, and have been presented by him to the Natural History Museum.

Labeo loveridgei, sp. n.

Body compressed; depth 4 in the length; length of head 4½. Snout obtusely pointed, strongly projecting beyond mouth, somewhat swollen, with scars of tubercles and with a curved transverse groove above, its length not quite ½ length of head. Eyes supero-lateral; diameter 5 in length of head; interorbital width 2½, width of mouth 2⅔ in length of head. Inner surface of lips with transverse plicæ; lower bordered in front with a fringe of papillæ; rostral flap free at the sides, its edge crenulate; barbel minute, hidden. Dorsal 12, with 9 branched rays, equidistant from end of snout and base of caudal; upper edge concave; third simple and first branched ray a little longer than head. Anal 8, with 5 branched rays. Pectoral nearly as long as head, not reaching pelvic, the first ray of which is below the fourth branched ray of dorsal. Caudal deeply emarginate. Caudal peduncle 1¼ as long as deep. 38 scales in lateral line, 5½ from origin of dorsal to lateral line, 4 between lateral line and pelvic fin, 16 round caudal peduncle.

A single specimen, 195 mm. long.

This species is near *L. forskalii* and *L. cylindricus*, which have a wider mouth and the snout broadly rounded.

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* I am unable to give external measurements.

Barbus aphantogramma, sp. n.

Depth of body 3⅓ to 3⅔ in the length, length of head 3½ to 4. Snout as long as or shorter than diameter of eye, which is 3½ to 4 in length of head; interorbital width 2½. Mouth small, terminal; one barbel on each side, its length about ½ diameter of eye. Dorsal 10–11, equidistant from eye and base of caudal; third ray a serrated spine, about ⅔ length of head; free edge of fin straight. Anal 8. Pectoral ⅔ to ¾ length of head, not reaching pelvics, which are in advance of dorsal. Caudal peduncle 1⅔ to 2 as long as deep. Scales radiately striated, 21 to 23 in a longitudinal series, 6 or 7 between dorsal and pelvic, 10 round caudal peduncle; lateral line absent, or reduced to 2 or 3 anterior scales with tubules. A dark lateral stripe; a dark spot at origin of dorsal, another at origin of anal, a third at base of caudal; fins pale.

Ten specimens, 30 to 38 mm. in total length.

Near *B. apleurogramma*, Bouleng., from Lake Victoria, which has 25 scales in a longitudinal series and 8 round the caudal peduncle, a longer dorsal spine, and a different coloration.

PAREUTROPIUS, gen. nov.

Differs from *Eutropius* only in the smaller dorsal fin, of a slender spine and three branched rays.

Pareutropius micristius, sp. n.

Depth of body 4 to 4½ in the length, length of head 5⅓ to 6. Mouth terminal or snout slightly projecting, as long as diameter of eye, which is 3⅓ to 3½ in length of head. Band of teeth on palate continuous or narrowly interrupted in the middle. Nasal barbel ⅔ to ¾ length of head, maxillary and outer mandibulary longer than head, inner mandibulary about ½ length of head. 12 gill-rakers on lower part of anterior arch. Dorsal I 3, small, well in advance of pelvics; spine slender, feebly serrated, ⅓ to ⅔ length of head. Anal 53–55. Pectoral nearly or quite reaching pelvics. Caudal deeply forked. Caudal peduncle not longer than deep. Brownish (in spirit); a dark spot above pectoral fin; a dark stripe along lateral line and another above anal fin.

Seven specimens; total length 75–100 mm.

IX.—*Descriptions of Three new Frogs in the Collection of the British Museum.* By G. A. BOULENGER, F.R.S.

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Rana hymenopus.

Vomerine teeth in long, transverse, slightly arched, oblique series between the choanæ, originating at the anterior corners of the latter and terminating on a line with their posterior borders. Head a little broader than long, much depressed; snout rounded, scarcely projecting, a little longer than the eye; canthus rostralis rounded; loreal region very oblique; nostril a little nearer the eye than the tip of the snout; interorbital width three-fourths that of the upper eyelid; tympanum very distinct, two-thirds the diameter of the eye. Fingers rather slender, obtusely pointed, first and second equal; subarticular tubercles rather large and very prominent. Hind limb rather slender; tibio-tarsal articulation reaching the tip of the snout, heels overlapping when the limbs are folded at right angles to the body; tibia $4\frac{1}{2}$ times as long as broad, $1\frac{5}{6}$ times in length of head and body; toes slender, obtusely pointed, half-webbed, three phalanges of fourth and two of third and fifth free; outer metatarsals united in the basal half; subarticular tubercles moderately large and very prominent; inner metatarsal tubercle oval, very prominent, one-third the length of the inner toe; no outer tubercle. Skin smooth; a glandular fold from below the eye to the shoulder. Greyish olive above, with dark dots and irregular spots; limbs with regular dark cross-bars; hinder side of thighs dark brown, with small yellow spots; lower parts white, throat spotted with brown.

From snout to vent 57 mm.

A single female specimen, labelled "South Africa," presented by Sir Andrew Smith.

In its half-webbed toes this frog constitutes an interesting link between the typical *Ranæ* and the group *Strongylopus* of Tschudi.

Rana pumilio.

Vomerine teeth in very short oblique series close to the anterior corners of the choanæ. Head slightly longer than broad, much depressed; snout obtusely pointed, projecting, slightly longer than the eye; canthus rostralis rounded;

loreal region very oblique, feebly concave; nostril equidistant from the eye and the tip of the snout; interorbital space as broad as the upper eyelid; tympanum very distinct, two-thirds to three-fourths the diameter of the eye. Fingers obtusely pointed, first, second, and fourth equal; subarticular tubercles moderately large, moderately prominent. Hind limb rather short, the tibio-tarsal articulation reaching the eye, the heels meeting or very feebly overlapping when the limbs are folded at right angles to the body; tibia a little more than twice in length of head and body; toes obtusely pointed, two-thirds webbed, three phalanges of fourth and one of fifth free; subarticular tubercles rather small, moderately prominent; two small metatarsal tubercles, inner oval and about one-third the length of the first toe, outer round; a small round tubercle on the tarsus just below the heel. Skin smooth or granulate above, with four interrupted narrow glandular folds along the back and a stronger dorsolateral; a glandular fold from the eye to the shoulder; sides granulate. Greyish olive above, with a whitish vertebral band or narrow streak, the dorso-lateral folds also whitish; back with dark spots or a dark band on each side of the light vertebral; a dark brown band from the end of the snout to the eye, continued behind the latter as a large temporal spot; tympanum reddish brown; a white streak along the upper lip; limbs with dark cross-bands; a white line along the inner side of the tibia; hinder side of thighs brown, with or without two interrupted white streaks; throat and belly white, lower surface of limbs flesh-colour. Male with a blackish external vocal sac on each side of the throat, close to the mandible, as in *R. mascareniensis*.

The male measures 27 mm. from snout to vent, the female 31.

Two specimens, the female with the body distended with eggs, were obtained by M. F. Lataste at Medine, Senegal, in September 1885. They were identified by me at the time as *R. mascareniensis*.

The smallest African frog of the genus *Rana*. Intermediate between *R. mascareniensis*, D. & B., and *R. trinodis*, Boettg.

Microhyla latastii.

Habit rather slender. Head as long as broad; snout obtusely pointed, as long as the orbit, projecting; interorbital space much broader than the upper eyelid, a little broader than the space between the nostrils. Fingers and toes moderately elongate, the tips dilated into very small discs; subarticular tubercles very prominent; first finger much shorter than second; three very prominent carpal tubercles; toes one-third webbed; two small but very prominent metatarsal tubercles, not larger than the subarticular tubercles, inner oval, outer round. Tibio-tarsal articulation reaching the eye; tibia four times as long as broad, a little more than half the length of head and body. Back with scattered small warts. Pale brown above, with a large dark brown marking, finely edged with white, from between the eyes to the vent, with three curved sinuses on each side, narrowest on the occiput, broadest on the sacral region; no dark lateral band; lower parts whitish, throat of male brown, darker on the chin.

From snout to vent 23 mm.

Two specimens, male and female, from Saigon, Cochin China, taken by M. Holbé in 1887, formed part of the Lataste Collection. Examples of *M. inornata*, Blgr., and *M. achatina*, Boie, were collected by M. Holbé in the same locality.

The more extensive web between the toes, the more slender hind limb, and the absence of a dark lateral band readily distinguish this frog from *M. achatina*.

X.—*Descriptions of Four new Snakes in the Collection of the British Museum.* By G. A. Boulenger, F.R.S.

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Cylindrophis aruensis.

Diameter of eye not quite one-third its distance from the nostril. Snout as long as the distance between the eyes. Rostral as deep as broad; nasals in contact behind the rostral; frontal as long as broad, as long as the prefrontals, little larger than the supraocular, larger than the parietal; six upper labials, third and fourth entering the eye. Scales in 24 rows; no enlarged ventrals; subcaudals 6. Reddish brown, with white transverse spots forming two alternating series on the back and cross-bars on the belly, some of which are complete, others interrupted and the two halves alternating; a pair of large white blotches on the nape; lower surface of tail white.

Total length 170 mm.

Two specimens from Aru Island, from Mr. H. Rolle's collection.

Allied to *C. boulengeri*, Roux, but frontal shield apparently smaller and 24 scales round the body instead of 20.

Zamenis hotsoni.

Snout moderately prominent, obtuse. Eye moderately large. Rostral broader than deep, the portion visible from above measuring one-fourth or one-third its distance from the frontal; internasals as long as or a little shorter than the prefrontals; frontal broader than the supraocular, once and a half to once and two-thirds as long as broad, longer than its distance from the end of the snout, shorter than the parietals; loreal as long as deep; one preocular, not reaching the frontal, with a subocular below it; two postoculars; temporals 1+2; seven upper labials, third and fourth entering the eye, fourth in contact with the anterior temporal; four lower labials in contact with the anterior chin-shields; posterior chin-shields as long as or a little longer than the anterior, separated from each other by scales. Scales smooth, with a single apical pit, in 17 rows. Ventrals not angulate laterally, 196; anal divided; subcaudals 90. Pale fawn-colour or greyish above, each scale, except the outermost, with a black central shaft; head without markings; upper lip, pre- and postoculars, outer row of scales, and lower parts yellowish white.

Two specimens, the larger measuring about 500 mm., from Shiraz, presented by Major J. E. B. Hotson to the Bombay Natural History Society. The smaller specimen is now in the British Museum.

Distinguished from *Z. gemonensis* and *Z. dahlii* by the smaller eye, from the former by the single scale-pits, from the latter by the number of rows of scales on the body and the less slender form.

Elaps omissus.

Eye a little shorter than its distance from the mouth. Snout obtusely pointed. Rostral large, nearly as deep as broad, its upper portion one-third its distance from the frontal; internasals three-fifths the length of the prefrontals; frontal twice as long as broad, as long as its distance from the end of the snout, shorter than the parietals, which are as long as their distance from the end of the snout; one pre- and two postoculars; posterior nasal narrowly separated from the preocular, the prefrontal in contact with the third upper labial; temporals 1+1; seven upper labials, third and fourth entering the eye; four lower labials in contact with the anterior chin-shields, which are slightly shorter than the posterior. Scales in 15 rows. Ventrals 214; anal divided; subcaudals 27, the six anterior entire. Tail ending in an obtuse point. Ten triads of black annuli on the body, the central annulus broadest, its width equal to the space separating the triads, white spaces (in spirit) with black dots; on the belly, the black bars nearly as broad as the white; one triad on the tail; head black above, with a white cross-band behind the eyes, the posterior three-fifths of the frontal and the anterior two-thirds of the parietals involved in it.

Total length 365 mm.; tail 28.

A single female specimen from Venezuela, received from Dr. F. Werner in 1900.

Appears to come very near *E. gravenhorstii*, Jan, which is only known to me from the description and figure.

Leptognathus hammondii.

Body slender, strongly compressed. Eye large. Rostral nearly twice as broad as deep, not visible from above; internasals about half as long as the prefrontals; frontal as long as broad, as long as its distance from the end of the snout, much shorter than the parietals; nasal divided; no preocular, loreal and prefrontal entering the eye; two large postoculars, with a small third between them and the eye; temporals 1+1 or 1+2; eight upper labials, third and fourth or second, third, and fourth entering the eye, sixth very large; first lower labial in contact with its fellow behind the symphysial; two pairs of chin-shields, the anterior as long as broad. Scales in 15 rows, vertebrals enlarged, as long as broad on the posterior half of the body. Ventrals 210; anal entire; subcaudals 121. 15 black annuli on the body, 10 on the tail, separated by much narrower white ones; head black, with white vermiculation on the upper head-shields, on the sides of the snout, and on the chin, white on the temples and on the occiput.

Total length 410 mm.; tail 120.

A single female specimen from Guatea, Western Ecuador, altitude 2900 feet, from the collection of Mr. G. Hammond.

Near *L. gracilis*, Blgr., likewise from Western Ecuador, which it resembles in the coloration, but different in the labial and temporal scutellation and in the more enlarged vertebral scales on the posterior part of the body. *L. articulata*, Cope, is described as having four pairs of chin-shields.

I seize this opportunity to point out that *Leptognathus copii*, Gthr., is distinct from *L. pavonina*, Schleg. It has the scales in 15 rows, as stated by Günther. The British Museum has recently acquired a second specimen, from Georgetown, British Guiana.

XI.—Notoryctes *in North-west Australia.*
By OLDFIELD THOMAS.

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IN 1910 Mr. Stockton, the Keeper of the Post Office at Wollal, on Ninety-mile beach, North-west Australia, captured a specimen of a Marsupial-mole (*Notoryctes*), an animal only previously known from Central and Southern Australia. The specimen was presented by a Mr. S. S. Pryor to the West Australian Museum at Perth, where it has been preserved till the present time.

Now, however, by the great kindness of Messrs. Alexander and Glauert of that Museum, I have been allowed to make an examination of it and to compare it with our series of the more southern *Notoryctes typhlops*.

As is not surprising, considering that its locality is nearly a thousand miles from that of *N. typhlops*, the north-western form proves to be distinct specifically, and may be described as follows:—

Notoryctes caurinus, sp. n.

Size rather less than in *N. typhlops*. General colour above approximately "pinkish cinnamon," slightly paler below. Cheeks, chin, and forearm more cinnamon-buff—in fact, the colour is very much as in Stirling's figure * of *N. typhlops*. Claws and nasal pad smaller than in the latter.

Skull rather smaller than that of *typhlops*, the reduction in size being mainly in the muzzle, which is both distinctly shorter and has a narrower nasal region, the breadth across the end of the nasals about 2·4 mm. as compared with 3·2 or more. And the nasal opening is also less in height. Palate slightly more imperfect. Bullæ rather larger.

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* Trans. Roy. Soc. S. Australia, 1891, pl. ii.

Five anterior upper teeth small and very uniform in size, i^1 scarcely exceeding the others, and the last of the five (probably p^1) is a small simple tooth hardly equalling the canine or posterior incisors. In *N. typhlops* this tooth is usually intermediate in size between these small anterior teeth and the much larger p^3 and p^4 behind it. I^1 touches its fellow of the opposite side, while the two are well separated in *N. typhlops*. Last molar—m^3—small, narrow, almost linear, scarcely showing any trace of the structure characteristic of the anterior molars; in *N. typhlops*, on the other hand, the tooth is usually a reduced imitation of those in front of it.

But the chief distinction is in the lower dentition, for *N. caurinus* carries the reduction of the teeth in the anterior premolar region one stage further than occurs in *N. typhlops*. As Dr. Gadow * has shown, that species varies considerably in the development of the teeth of this region, so that different specimens have in front of the secator (fifth tooth from the back) either three full-sized teeth and a rudiment, four full-sized teeth, or four and a rudiment—in the latter cases the full number of ten lower teeth being present. But in *N. caurinus* there are only three pre-secator teeth, all full-sized and not rudimentary, so that there are only eight teeth in the whole series. And these three teeth occupy but a very short space—2·8 mm.—in correlation with the shortened muzzle of the skull, and there is no special space between the last of the three and the secator next behind it.

In some groups this difference in number would be of generic or subgeneric value; but here, where we have already in the type-species a range of from what we may call 3½ to 4½ teeth, commonly differing on the two sides of the jaw, the further reduction to three is clearly only of specific value. The lower molars are all rather smaller than in *N. typhlops*, but there is no perceptible difference in the structure of m_3. With the lesser size and smaller number of the teeth the total length of the lower tooth-row forms a very good diagnostic character of *N. caurinus*.

Dimensions of the type (measured on the dried skin):—

Head and body 90 mm.; tail 12; nose-pad 9·2 × 5·7; large anterior claw 13·8 × 3·3; second large claw 12·2 × 6·7.

Skull: greatest length 23·7; condylo-basal length 21;

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* P. Z. S. 1891, p. 366.

zygomatic breadth 14·8; breadth across forehead 9·6; interorbital breadth 8·3; palatal length 10·5; breadth outside m^1 9. Combined length of five small anterior teeth 4·2; combined length of four molariform teeth (p^4–m^3) 4·2; lower tooth-row 8·3 (9·8 in *N. typhlops*); three anterior teeth 2·8; four molariform teeth 4·4.

Hab. Wollal, N.W. Australia.

Type. Adult female. Skin no. 10442 in West Australian Museum, Perth. Skull transferred by exchange to British Museum, B.M. no. 20. 5. 21. 1. Captured 29th August, 1910.

It is a matter of very great interest to find this anomalous type of marsupial represented by a second species in the far North-west, and the authorities of the Perth Museum are deserving of our gratitude for permitting a comparison to be made of the unique Wollal specimen with the allied form of Central Australia.

XII.—*A new Genus of* Echimyinæ.

By OLDFIELD THOMAS.

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AMONG some Amazonian mammals sent for determination by the authorities of the Goeldi Museum, Para, there occurs a single specimen of a Spiny-rat collected by Fräulein Dr. E. Snethlage on the River Tapajoz, and this proves to represent a new genus of that most interesting group. It belongs to the series of genera related to *Echimys* (better known as *Loncheres*), and, like the greater number of them, is modified for an arboreal life. Its dentition is of the special type, called "reduced heptamerous" by Miller, which crops up so frequently among the hystricomorph rodents, but it represents a phase of development not actually found in the Echimyinæ, while somewhat similar to that of *Erethizon* and others.

The animal's external appearance is very striking and quite peculiar to itself.

LONCHOTHRIX, gen. nov.

Pelage highly spinous. Feet short. Tail tufted.

Skull closely similar to that of *Mesomys*.

Dentition above not specialized, in some ways very like a miniature of that of *Erethizon*.

Other external characters described below.

Skull so like that of *Mesomys hispidus* that it is difficult to find any character of more than specific value. The muzzle is broader, the nasals being more parallel-sided, less tapered backwards. Interorbital region broad, with overhanging ledges. Brain-case low, smooth above, much broadened posteriorly. Malar more projected forward anteriorly than in *Mesomys*, about as in *Echimys*. Palatal foramina longer and more open than in *Mesomys*. Mesopterygoid fossa narrow, reaching forward to the level of the middle of m^2. Hamular processes of pterygoids narrow, scarcely spatulate at all. Bullæ of average size.

Incisors strong, deep from before backwards, less opisthodont than in allied forms, the incisive angle of the type-specimen 93°.

Upper cheek-teeth about as broad as long, of medium height, not hypsodont, each with two salient angles internally and four externally, the last external with an indication of subdivision, so that the full number of enamel-plates is, as usual, five. The height of the crests and the depth of the valleys between them very much as in *Erethizon*, to whose teeth those of *Lonchothrix* bear a strong resemblance in miniature, though the hollows are more linear, less broadened antero-posteriorly. Outer valleys penetrating about two-thirds across each tooth. Below the resemblance to *Erethizon* disappears ; p_4 has five crests on its inner half, m_1 three and an imperfect fourth, m_2 and m_3 three ; all have, as usual, one deep outer notch separating the two salient angles.

Although less specialized, the teeth have also a certain resemblance to those of *Cercomys*.

Genotype. *Lonchothrix emiliæ*, sp. n.

It is difficult to say to which of the described forms this striking new genus is most nearly allied. Its short climbing feet and strongly spinous coat give it a general resemblance to *Echimys*, but its brachyodont molars, as broad as long, are very different from those of either *Echimys* or any of the genera allied to it—such as *Nelomys* and *Diplothrix*,—nor have they any of the high specializations found in *Dactylomys* and *Kannabateomys* ; and its tufted tail is peculiar to itself.

Lonchothrix emiliæ, sp. n.

Size about as in *Mesomys hispidus*. Pelage excessively spinous, the spines on the hinder back about 30 mm. in length and attaining 2·3 mm. in breadth; true hair hardly perceptible anywhere, there being only a few short hairs hidden among the bases of the spines, while the covering of the lower surface is also almost wholly spinous. Whisker-bristles very long. General colour above dark brown, punctuated on the shoulders, sides, and rump by buffy. Individually the spines on the dorsal saddle are greyish brown darkening to blackish brown terminally, the lateral and posterior ones with broad buffy tips. On the nape and sides the underlying hairs, which are bright ochraceous buffy, show through the spines and affect the general colour. Under surface dull buffy whitish, a little darker on the chest. Inner sides of arms and legs buffy whitish. Hands and feet dull whitish. Feet comparatively short and broad, as in *Mesomys* and *Echimys*. Tail long, its proximal two-thirds almost naked, merely with a few minute scattered bristles on it; these lengthen terminally, and at the end there is a conspicuous vertically distichous brush of long coarse dark brown hairs, of which the longest—those of the upper side—attain over 70 mm. in length.

Skull and teeth as above described.

Dimensions of the type:—

Head and body 177 mm.; tail 189; hind foot 30; ear 13.

Skull: greatest length 43; condylo-incisive length 39; zygomatic breadth 25; nasals 12; interorbital breadth 11; mastoid breadth 20·3; palatilar length 14·2; palatal foramina 5; upper cheek-tooth series 8.

Hab. (of type). Villa Braga, on the left bank of the Rio Tapajoz, just above the first rapids.

Type. Adult male. B.M. no. 20. 6. 4. 1. Original number 142. Collected 8th February, 1917, by Fräulein Dr. E. Snethlage. Presented by the Goeldi Museum.

This striking and peculiar animal, which was captured by Fräulein Snethlage herself, forms a discovery of the utmost interest, and I have very great pleasure in connecting her name with it, adding, as it does, another to the many remarkable Amazonian mammals which she has been instrumental in bringing to the notice of zoologists.

XIII.—*On Mammals from near Tinogasta, Catamarca, collected by Sr. Budin.* By OLDFIELD THOMAS.

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DURING December and January Sr. Budin made a collection in a hilly district known as La Puntilla, near Tinogasta, Catamarca. La Puntilla would appear to be a few miles out from Tinogasta towards Copacabana, at an altitude of about 1000 metres.

The collection is not a large one, as the place did not prove very favourable for general collecting; but among the eight species of which it consists not only is there a new tuco-tuco, but representatives of a highly remarkable new genus of Octodonts related to *Aconæmys*, of which it seems to be a non-fossorial ally with a strong external resemblance to *Octodontomys*. This is a very striking discovery, and one of which Sr. Budin may well be proud, adding as it does a distinct new type to so peculiar a group.

In spite of the ants, which, as usual in summer collecting, formed a terrible plague, the specimens sent are all beautifully prepared, and form a valuable addition to the National Collection.

1. *Hesperomys musculinus*, Thos.

♂. 856; ♀. 835, 893.

2. *Hesperomys murillus cordovensis*, Thos.

♂. 876, 892.

The determinations of the specimens of *Hesperomys* are very doubtful, and must await further material for revision. Female examples showing the number of mammæ are especially desirable.

"Caught among the piles of branches in the cultivated fields."

3. *Graomys cachinus*, All.

♂. 833, 837, 840, 842, 846, 851, 857, 861, 862, 865, 883, 884, 886, 894, 899.

♀. 853, 854, 858, 866, 869, 872, 873, 875, 889, 895, 896, 898.

In marked contrast to the state of things at Chumbicha and Otro Cerro * we have here only a single form of *Graomys*, all the specimens of this fine series being practically identical in size. But a rather considerable number of them are immature.

4. *Phyllotis* sp. (?).

♀. 834 (young).
Too young for determination.

5. *Akodon alterus*, Thos.

♂. 841, 859, 878, 890; ♀. 839, 843, 867, 887, 897.
Very similar to our series from Otro Cerro.

No. 878, quite young, shows that m^1 has a well-defined anterior median groove at its tip.

6. *Octomys mimax*, gen. et sp. n.

♂. 850, 848 (young); ♀. 838, 845, 880.

OCTOMYS †, gen. nov. (Octodontidæ).

General external characters and shape of skull about as in *Octodontomys*; molar structure approximately as in *Aconæmys*, of which it is probably a non-fossorial rock-inhabiting representative.

External characters very much as in *Octodontomys*, and, indeed, as in many other rock-inhabiting dry-country Muridæ, such as the larger gerbils—the light colour, whitish under surface, large ears, and long tufted tail all being characters of such animals. Indeed, the resemblance to *Octodontomys gliroides* is almost complete, so that even as species the two might readily be mistaken for each other. Structure of ears and feet very much as in the older known animal, though the granulation of the soles is a little less coarse.

All these characters present a striking contrast to those of the one Octodont genus with more or less similar teeth—namely, *Aconæmys* (*Schizodon* of Waterhouse),—which is a fossorial short-eared, long-clawed, dark-bellied, and short-tailed form, as different as possible from the present animal.

Skull also with the general shape of that of *Octodontomys*, less like that of *Octodon*, wholly unlike that of the fossorially specialized *Aconæmys*. Muzzle slender. Supraorbital edges sharp, not beaded, without postorbital processes. Interparietal region without ridges, even in old specimens. A large supra-meatal island visible on the top of the skull. Palatal foramina short and broad, with a broad median septum. Mesopterygoid fossæ narrow, pointed anteriorly, reaching forward to the level of the middle of m^2. Bullæ very large, larger than in any other member of the group.

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* *Cf.* Ann. & Mag. Nat. Hist. (9) iii. p. 494 (1919).

† Not only does this animal belong to the group whose dental formula gave rise to the name *Octodon*, but its molars themselves have a pattern nearly resembling the figure 8.

Teeth.—Incisors of medium strength, more opisthodont than in any of the allied genera (again making a parallel to certain Gerbillines), the incisive angle, as measured from the surface of the tooth-row, about 76°, but, owing to the hypertrophy of the bullæ, they appear still more turned in backwards in relation to the general lines of the skull.

Molars rootless, their pattern strikingly like that in *Aconæmys* (figured by Waterhouse *), the three anterior teeth above and below 8-shaped, with two subequal lobes. M^3 and m_3 with the posterior lobe reduced. A capsule appearing on the outer side of the jaw at the root of m_2.

Genotype. *Octomys mimax*, sp. n.

The Octodontinæ—if we accept the obviously correct exclusion of *Abrocoma* from them advocated by Miller and Gidley †—fall into two groups, one with crescentic and the other with 8-shaped teeth. Each of these groups has, again, fossorial and non-fossorial members, *Octodon* and *Octodontomys* being the non-fossorial members of the crescent-toothed group and *Ctenomys* the fossorial, while in the other group *Spalacopus* and *Aconæmys* are both fossorial, and the present new genus now supplies to it a non-fossorial representative.

This handsome and remarkable animal, so strikingly like *Octodontomys* externally but so different from it essentially, is one of the most striking novelties that I have had the opportunity of describing from Argentina, and Sr. Budin is to be congratulated on so fine a discovery.

Octomys mimax, sp. n.

Size and general external appearance about as in *Octodontomys gliroides*. Colour of body above pale drabby buff. Under surface white, the hairs along the median area white to their bases, but laterally they have pale slaty bases; line of demarcation not strongly marked. Ears large, with whitish tufts at their anterior base and on the neck behind them; their surface brown flesh-colour with fine white hairs scattered over them. Hands and feet white. Tail long, hairy, becoming heavily tufted terminally, the proximal half buffy below and buffy mixed with blackish above, the terminal tuft either mixed buffy and dark blackish brown throughout or the end wholly blackish brown; end-hairs attaining over 40 mm. in length.

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* Nat. Hist. Mamm. ii. pl. viii. fig. 4 (1848).

† Journ. Wash. Acad. Sci. viii. p. 445 (1918).

Skull as above described.

Dimensions of the type:—

Head and body 165 mm.; tail 179; hind foot 34·5; ear 25·3.

Skull: greatest length 44; condylo-incisive length 41·7; zygomatic breadth 21; nasals 15 × 4·7; interorbital breadth 9·5; least breadth across brain-case 17·5; bi-meatal breadth 21·6; palatilar length 16·5; palatal foramina 3·7 × 3·2; diagonal horizontal length of bulla 15; upper molar series (crowns) 8·6.

Type. Adult female. B.M. no. 20. 5. 11. 33. Original number 880. Collected 5th January, 1920.

Sr. Budin says of this animal that the specimens were captured among some large rocks which had fallen from a cliff in a ravine where there was a little water. It appeared to be very rare, as he was only able to find two of its habitations, close to each other, and none in any of the other ravines in the neighbourhood. It was also entirely unknown to the natives.

7. *Ctenomys coludo*, sp. n.

♂. 849, 870, 874, 879, 885, 891; ♀. 836, 877.

A rather large pale species, with comparatively long tail.

Size fairly large, though less than in *C. knighti.* Fur rather thin and poor. General colour above pale, about as in *C. juris*, paler than in most species, though not so pale as in *luteolus* and *opimus*; dorsal colour most nearly matching "sayal brown"; sides and under surface little paler. Area round ears without special markings. Hairs of hands and feet dull whitish. Tail rather longer than usual in the genus, dull brown along the top, though some of the crest-hairs are whitish; sides and below dull white.

Skull rather slender, the interorbital region and brain-case narrow. Nasals broad in front, evenly narrowed backwards.

Frontal region flat. Interparietal perceptible in all specimens, even in the type, which is old enough to have its basilar suture partially closed. Line of posterior ridges directly transverse. Outer base of anteorbital foramen very slender. Malar ridges particularly strongly marked, sharp, the surface concave below them. Meatal area, as viewed from above, apparently larger than usual. A well-marked bulla-island visible on top of skull. Opening of choanæ not very sharply angular, level with the middle of m^2. Bullæ large and swollen, larger than in *knighti* and nearly as large as in *luteolus*, both of these being larger species.

Molars small in comparison with the size of the animal. Longer diameter of m^3 scarcely greater than shorter.

Dimensions of the type:—

Head and body 205 mm.; tail 97; hind foot 36·5.

Skull: greatest median length 47; gnathion to back of bulla 49; condylo-incisive length 47·5; zygomatic breadth 31; nasals 17·5 × 8·3; interorbital breadth 9·3; least breadth across brain-case 18; bi-meatal breadth 31; palatilar length 21·7; diagonal horizontal length of bulla 18·5, breadth of bulla at right angles to last, exclusive of meatal tube, 9·5; upper molar series (crowns) 8·8, oblique diameter of m^1 3·6, of m^3 1·7.

Type. Fully adult male. B.M. no. 20. 5. 11. 39. Original number 891. Collected 17th January, 1920.

This tuco-tuco is readily recognizable by its uniform pale colour, comparatively long tail, narrow skull, large bullæ, and the other characters above detailed. As usual in *Ctenomys*, there appear to be no characters indicative of any group-relationship, but of the two species geographically nearest to it, *C. knighti* of Otro Cerro is much darker in colour, with shorter tail, broader frontal region, and larger teeth, while *C. fochi* of Chumbicha is little more than half its bulk, besides differing in other respects.

Sr. Budin found what he believed to be evidence that these tuco-tucos had cannibal propensities, and devoured the dead bodies of such of their comrades as were caught in the traps. This habit is common in Muridæ, but I think had not been before observed in Octodontidæ.

8. *Caviella mœnas*, Thos.

♂. 844, 852, 860; ♀. 832, 847, 855, 863, 864, 868, 871, 881, 882, 888.

XIV.—*Notes on Acari parasitic on Birds, with Descriptions of Two new Species.* By STANLEY HIRST.

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Syringophilus columbæ, sp. n.

♀?. Body elongated and very narrow. Only two hairs are present at anterior end of scutum, and they are much shorter than in the female or nymphs of *S. bipectinatus.* The other hairs of the *dorsum*, especially those on the hinder end of the scutum, are longer than in *S. bipectinatus.* Straight cellular portion of trachea short, consisting of only four cells. Claws of legs slender; the comb consists of fewer setæ than in *S. bipectinatus*, and the modified hair on the tarsus on each side of the claws is much wider, being scale-like and striated.

Host. Domestic pigeon; inside quill of feathers. Dallas, Texas (*Babcock & Wood*). Specimens examined through the kindness of Mr. F. C. Bishopp, of the United States Department of Agriculture.

Pterolichus sculpturatus, sp. n.

♂. Very similar to *P. bicaudatus*, but the posterior lobes of the abdomen are not so rounded in outline. Posterior plate of dorsum ornamented with minute rosettes or stars (apparently sometimes raised on very slight granules), whereas in *P. bicaudatus* the punctations are uniformly distributed and do not form rosettes.

Length (including capitulum) 540 μ.

Nymph (second stage). Posterior plate of dorsum very unlike that of *P. bicaudatus*, being almost oblong in shape, except for the posterior margin, which is notched or indented in the middle. Lateral margins practically straight and parallel with one another; the anterior margin is also practically straight. Surface of this plate sculptured with numerous minute rosettes. Posterior end of abdomen with two pairs of long hairs, as in *P. bicaudatus.*

Length (including capitulum) 560 μ.

Host. South African ostrich, Transvaal; a number of examples inside quills of that bird: Onderstepoort (24. 4. 19);

received through the kindness of Mr. G. A. Bedford, of the Union Veterinary Station.

Pterolichus bicaudatus, Gerv.

Nymph (second stage). Posterior plate of *dorsum* roughly triangular or elongate heart-shaped in outline, the apex pointing forwards; posterior margin of this plate indented in the middle; its surface is finely and evenly punctated.

Host. South African ostrich. I have examined specimens of this species from Sterkstroom, Cape Colony, and from California.

Liponyssus silviarum, Can. & F.

Dermanyssus silviarum, Canestrini and Fanzago, Atti R. Inst. Venet. 1877-1878, (5) iv. p. 124.
Leiognathus silviarum, Canestrini, Prospett. Acarof. Ital. 1885, i. p. 121.
? *Lophoptes patavinus*, Mégnin, C. R. Soc. Biol. 1891, iii.
Liponyssus canadensis, Banks, Washington, Proc. Ent. Soc. 1909, xi. p. 134.

This species occurs both on sparrows and poultry in the United States, and this is of some interest, for the species has not hitherto been recorded as a parasite of poultry (unless Mégnin's *Lophoptes patavinus* is the same species). It differs from the very closely allied species *L. bursa* principally in having only one pair of long hairs at the extreme posterior end of the dorsal scutum, whereas in *L. bursa* there are always two quite long pairs of hairs in this position.

Hosts and localities. I have examined specimens from poultry from the following localities:—Harvel and Raymond, Illinois; Lafayette, Indiana; Aberdeen, South Dacota; Beltsville, Maryland; Washington, D.C. It occurs on sparrows in the following localities:—Raymond, Illinois; Aberdeen, South Dacota; Dallas, Texas. In the British Museum there are specimens from Russia found on *Motacilla alba*, and others from the Zoological Gardens (on European sparrow-hawk and Indian jay).

Liponyssus bursa, Berlese.

Additional localities. Gharbia Province, Lower Egypt; two lots of this species from domestic poultry, collected autumn 1918 by Mr. Aghion. Dallas, Texas; on English sparrow (*F. C. Bishopp*).

XV.—Oxyuris paronai, *v. Linst., and its Association with another Oxyurid in the same Host.* By H. A. Baylis, M.A.

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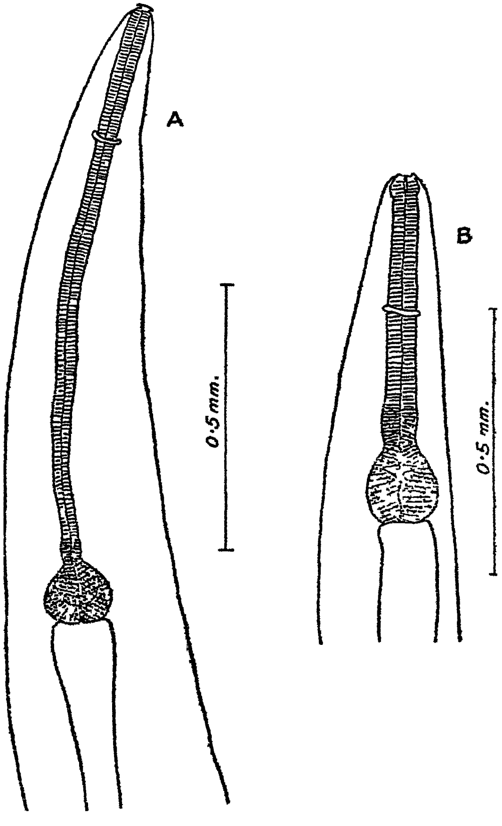
In working over a miscellaneous collection of nematode and other parasites submitted by Mr. A. Loveridge, there occurred a tube containing large numbers of small Oxyurid worms from the very remarkable lizard *Macroscincus coctæi,* which is

Fig. 1.



Head and œsophageal region (A) of *Paracis paronai,* (B) of *Oxyuris loveridgei,* both drawn to the same scale of magnification, from female specimens.

found only in the Cape Verde Islands. The material proved to include two forms of approximately the same size, but easily distinguishable, even when viewed in spirit under a low magnification, by the strikingly different proportional lengths of the œsophagus (fig. 1, A and B). In one form, of which both sexes are present in large numbers, the œsophagus is very long and slender. This is undoubtedly the species described under the name of *Oxyuris paronai* by von Linstow (1893), from the same host-species. The other form has a short and relatively stout œsophagus, and, though the specimens number some hundreds, all are females.

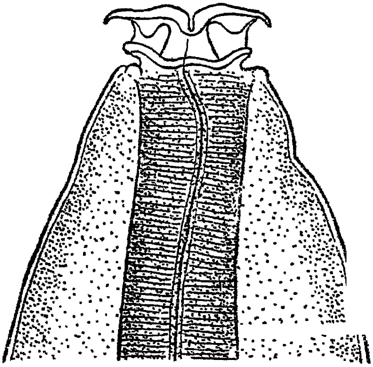
von Linstow's original specimens of *Oxyuris paronai* are in the British Museum, and on examining them with a view to placing beyond doubt the determination of the new material, it at once became apparent that the same two forms were again present. Further investigation, in this case also, failed to reveal any males of the form with short œsophagus, though males of the other form were present in plenty. It appears, therefore, that the association of these two forms in *Macroscincus* is of common occurrence. It was even suspected for a time that this might be a case of very marked dimorphism limited to the female sex. Closer investigation, however, lends more support to the view that the forms are specifically, or even generically, distinct. The females of the form with short œsophagus are fully mature, and contain ova, and it seems possible that they are parthenogenetic, or represent a parthenogenetic generation.

Oxyuris paronai appears to be referable to the genus *Paracis*, as recently defined by Railliet and Henry (1916), of which the genotype is *P. longicollis* (Schneider, 1866) from the tortoise. A comparison of the figures of the tails of males given by Schneider (1866, pl. vii. fig. 8) and by v. Linstow (1893, pl. vii. figs. 18, 19) is sufficient to demonstrate this. Both forms have a blunt, finger-like, caudal appendage in the male, with a pair of papillæ close to the tip; a single spicule, and an accessory piece which forms a median projection behind the cloaca; and a group of paired papillæ surrounding the cloacal aperture. They also agree in the great relative length of the œsophagus.

The structure of the mouth in *P. paronai*, though difficult to make out owing to the very small size of the head, seems to offer characters which may prove to be of generic rather than specific importance. The aperture of the mouth, as v. Linstow indicates, is surrounded by a delicate, membranous, triangular, funnel-shaped apparatus. This, however, is fully protruded in only a small proportion of the specimens. It then has the appearance represented in fig. 2, when seen under a high magnification ($\frac{1}{12}''$ oil-immersion objective). In the majority of the specimens the "funnel" is withdrawn into the anterior end of the œsophagus. This arrangement somewhat resembles the structure seen in *Crossocephalus.* In that genus, however, the funnel-like apparatus supported by the six jaws is *inverted* into the œsophagus when closed. In *P. paronai,* as far as can be made out, it is probably simply retracted, without inversion.

The "pigmentation" of the œsophagus, intestine, and other parts of *O. paronai,* referred to by von Linstow, seems to have been due to some artificial discoloration. It is not seen in the material collected by Mr. Loveridge.

Fig. 2.



Anterior extremity of *Paracis paronai,* highly magnified.

As, at present, generic distinctions among the Oxyuridæ rest almost entirely upon male characters, it is proposed to call the new form, as distinct from *P. paronai, Oxyuris loveridgei,* sp. n., using the name *Oxyuris* in a broad sense. Further data may show that it is really a dimorphic form of *P. paronai,* but the chief reasons for regarding it for the present as a distinct species are: (1) the different proportional length of the œsophagus; (2) the different structure of the mouth, which appears to be quite simple and without the funnel-like apparatus, but merely surrounded by three small sessile papillæ; (3) the position of the vulva, which is in front of the middle of the body, instead of behind it, as in *P. paronai* *; (4) the much finer striation of the cuticle (in the females of *P. paronai* the striation is so coarse as to be conspicuous under a very low power of the microscope); and (5) the slightly larger dimensions of the eggs.

Measurements of Paracis paronai *and* Oxyuris loveridgei.

(All measurements are in mm. The figures in square brackets have been calculated from von Linstow's proportional measurements.)

	Paracis paronai (v. Linst.).				*Oxyuris loveridgei.*
	Measurements given by von Linstow.		Measurements of Mr. Loveridge's material.		
	♂.	♀.	♂.	♀.	
Length	3·12	5·88 †	2·5–2·9	3·8–4·4	4·45–5·3
Maximum thickness	0·22	0·42	0·25	0·43	0·4
Diameter of head	....		0·03–0·04		0·07–0·08
Length of tail	[0·087]	[0·24]	0·08–0·09	0·3–0·6	0·5–0·7
Distance from anterior end to end of œsophagus (including bulb)	[1·16]	[1·68]	0·85–1·0	1·1–1·2	0·6–0·7
Diameter of œsophagus	0·0396		0·03	0·04	0·06
Diameter of œsophageal bulb	0·13		0·10	0·13	0·13–0·14
Distance from anterior end to nerve-ring	0·26		0·23	0·26	0·25
Distance from anterior end to excretory pore	....		0·94–1·15	1·35–1·45	0·8–0·98
Distance apart of cuticular striations	0·012		0·015		0·005
Length of spicule	0·117	..	0·1	..	....
Size of ova	0·15×0·07		0·17×0·08		0·18×0·09

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* v. Linstow gives the proportion in which the vulva divides the body as "37 : 19." The vulva, though always behind the middle, is usually much nearer to it than this.

† The exceptionally large figure for the total length of the female given by von Linstow was possibly based on a specimen of *O. loveridgei*, as the two forms were not distinguished by him.

XVI.—*On the Use of the Generic Name* Ceratopogon, *Meigen* (*Diptera*, Chironomidæ). By F. W. EDWARDS.

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SINCE the old genus *Ceratopogon* was broken up by Kieffer in 1901 much uncertainty has existed as to which group the old name should be applied to, different authors using the name in different senses. It is highly desirable to arrive at definite and permanent conclusions on this point, and the following note has been penned with this object in view.

The main facts, which are not in question, are these :—

The genus *Ceratopogon* was founded by Meigen in Illiger's 'Magazine' for 1803, a short diagnosis being given, and "*Tipula barbicornis*, Fab.," being the only species mentioned as belonging to the genus. The earlier name *Helea* was published in 1800 without any species being mentioned, and is now rejected by nearly all dipterists on this ground, together with the other names proposed in the "Nouvelle Classification." In his "Klassifikazion" Meigen introduces a number of new species, but "*barbicornis*, Fab.," is placed among other species of which Meigen had not seen specimens as belonging either to *Corethra*, *Chironomus*, *Tanypus*, or *Ceratopogon*. He also remarks (p. 35) : "Aus dieser Beschreibung [of Fabricius] folgt, dass dieser Art unter *Ceratopogon* gehöret. Ob aber Gmelin (oder vielmehr Linnée) und Schrank diese oder den oben beschriebenen *C. communis* unter ihrer *Tipula barbicornis* verstanden haben, mag ich nicht entscheiden." Later, Meigen (Syst. Beschr. vi. p. 261) notes under *barbicornis* that "das Exemplar in Fabricius' Sammlung ist ein *Chironomus*, *Chir. obscurus*."

Now, since on its first introduction only a single species was mentioned as belonging to the genus, it is clear that, if the rules of zoological nomenclature are to be strictly followed, this must be regarded as the type-species. Accordingly, Kieffer has argued (Zool. Anz. xxx. p. 516) that *T. barbicornis* is the type, and that, since Meigen has informed us that Fabricius's specimen was only *Chironomus obscurus*, Mg. (which is supposed to be an *Orthocladius*), *Ceratopogon* should be used in place of *Orthocladius*.

But against this view it should be remembered (1) that Fabricius was not the author of the name *barbicornis*, and that what Linnæus meant by this name is unknown ; (2) that Meigen, as he himself informs us, had not seen examples of *barbicornis*, but was relying on Fabricius's diagnosis for his inclusion of the species in *Ceratopogon*; and (3) that many writers, with whom I emphatically agree, would in cases of misidentification take the species which an author actually had, not that which he imagined he had, as the type of a genus.

The question is, therefore, what species had Meigen before him under the name *barbicornis* in 1803? From the remarks quoted above, I think there can be practically no doubt that it was the one which in 1804 he called *C. communis*. This was doubtless the reason why Coquillet in 1910 indicated *communis* as the type-species, a course in which I consider he was perfectly right.

Kieffer, in the paper cited, maintains that the species which Meigen had in 1803 cannot be recognized, and argues from this that the real validity of the genus *Ceratopogon* can only date from Meigen's fuller work, where other species are included and a fuller diagnosis given. He quotes Meigen's work of 1818 (omitting that of 1804), where the hairy wings are referred to in the generic description, and, while rejecting *Ceratopogon* altogether, uses *Forcipomyia* in place of it for one of the hairy-winged groups, taking for type *F. ambiguus*, Mg. In more recent papers (Ann. Mus. Nat. Hung. 1917) he has reverted to the use of *Ceratopogon* for this same group, still with the type *ambiguus*, Mg.

I maintain that this course is unjustifiable for two reasons —firstly, although Meigen, in his 1804 diagnosis, mentions the hairy wings *, Latreille, in 1805, proposed the genus *Culicoides*, with the type *pulicaris*, L.; and from the table of species which Meigen gives in 1830 (Syst. Beschr. vi. p. 266) it is clear that he accepts *Culicoides* as a restriction, including in it all the species with hairy wings (although he does not actually admit its generic value), thus:—

> "A. Alle Schenkel einfach, wehrlos.
> "(*a*) Mit nackten Flügeln.
> "(*b*) Mit haarigen Flügeln (*Culicoides*, Latreille)."

In the second place—and this is, perhaps, even more important,—Kieffer's adoption of *ambiguus* as the type is quite illegitimate if it can be discovered what Meigen meant by *communis*. The description of 1804 is altogether inadequate, but in 1818 he adds the information "Alle Schenkel einfach, wehrlos," and in 1830 "Mit nackten Flügeln." The name *Ceratopogon* must, therefore, be used for one of the groups with bare or practically bare wings.

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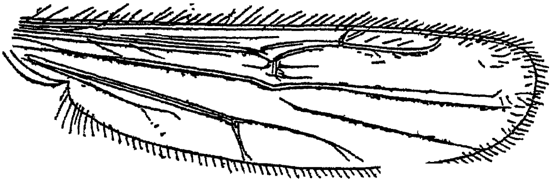
* Meigen also states in this diagnosis "Die Flügel parallel-dachformig" (*i. e.* held in roof-like position in rest), which is a character of the *Orthocladius* group, but not of the Ceratopogoninæ. This might be adduced in support of the view that *Ceratopogon* should be used for *Orthocladius*; but I think it is evident that Meigen simply made a mistake on this point. He corrects the statement in 1818 to read "Flügel parallel flach aufliegend."

In his original description of *C. communis* (1804) Meigen says "Man findet sie im Sommer sehr häufig auf Schirmgewächsen." This habitat agrees with that of *C. pavidus*, Winn., and its allies, several species of which occur in great numbers on flower-heads of *Angelica*, but not with that of the other bare-winged groups, the females of which are predaceous and are only seldom found on flowers. Malloch, in his 'Chironomidæ of Illinois' (1915), has adopted the name *Ceratopogon* for this group of species (which Kieffer includes under the genera *Atrichopogon* and *Kempia*), and I was at first inclined to follow him in this respect.

However, in order to make quite sure, if possible, of the identity of *C. communis*, I wrote to Mons. Séguy, of the Paris Museum, asking him for information as to Meigen's type, if it should be in existence. His report was surprising, but decisive, as from his notes and the carefully drawn sketch of the wing of the type male which he sent (reproduced herewith) it is clear that *C. communis* differs in some respects from all the species described by Winnertz, and will not fit into any of the genera into which the group has been divided by Kieffer, though it shows relations with several.



Ceratopogon communis, ♂. Drawn by E. Séguy.

The genus *Ceratopogon* must therefore for the present include only the single species *communis*, Mg., and may be diagnosed as follows, from M. Séguy's information:—

CERATOPOGON (Meigen, 1803), Edwards, 1920.

♂. Claws simple, equal. No empodia. Femora slender, unarmed. Eyes quite bare. Wings with microscopic pubescence (microtrichia) over the whole surface, and with a few suberect macrotrichia round the tip and in the second radial cell. Costa extending beyond two-thirds of the wing-length; two radial cells, both rather elongate and about equal in length. Media sessile, forking at level of *r–m* cross-vein. Cubitus ("postical" of Kieffer) with the base of its fork proximal to that of the media. Anal vein bent some distance before its tip, a rather indistinct fold arising from the bend, giving an appearance of forking (as in *Palpomyia*, *Bezzia*, &c.).

The genus *Ceratopogon* will fitly take its place among the group of small genera which are intermediate in some respects between the two main groups of the subfamily, agreeing in habits with *Kempia* and *Atrichopogon*, but in structure approaching nearer to *Johannsenomyia* and *Stilobezzia*. From the former of these it differs in the shorter, equal, radial cells and the presence of macrotrichia at the tip of the wing, and from the latter in the sessile media and in some other points.

XVII.—*Some new or little-known Gomphine Dragonflies from South America*. By HERBERT CAMPION.

[Plates VI. & VII.]

WHILE engaged from time to time in identifying dragonflies from British Guiana, I have found it necessary to consider related species from other parts of the Neotropical Region. Particulars of certain members of the subfamily Gomphinæ which have been studied in this way are now placed on record.

Gomphoides dentatus, Selys.

Aphylla dentata, Selys, Bull. Acad. Belg. (2) vii. p. 547 (1859).

I have pleasure in acknowledging my indebtedness to Monsieur G. Severin, Conservateur au Musée Royal d'Histoire Naturelle de Belgique, for his great kindness in allowing me to examine the original material of this species, besides preparing for me photographs of the wings and anal appendages of the male type (Pl. VI. figs. 1 & 2). The material in question consists of (1) a male, the type of the species, through the abdomen of which a fine skewer has been passed, to give it additional support; (2) a female, also skewered, which may be conspecific with the male; and

(3) a second female, without any skewer, which is probably not conspecific either with the male or the first-named female. The three specimens are labelled as follows:—(1) "35" (white label), "Amazon" (white label), "Bates" (green label), "*Aphylla dentata*, De Selys, ♂, à renvoyer" (buff label), "141, *dentata*, Bate[s]" (white label, marked in pencil); (2) "Amazon" (white label), "Bates" (green label), "*Aphylla dentata*, De Selys, ♀, à renvoyer" (buff label); (3) "Amazon" (white label), "Bates" (green label), "*Aphylla dentata*, S., ♀" (white label).

The original description states that the male type was obtained by Bates on "les bords de l'Amazone," and, as it bears the number 35, it may be assumed that Santarem was the exact place of capture, as it certainly was of other specimens carrying the same number. In this specimen, at the margin of the wing there are from two (right wings) to three (left wings) cells between M_2 and Rs, from three (hind wings) to four (fore wings) between M_3 and M_4, and from five (hind wings) to six or seven (fore wings) cells between Cu_1 and Cu_2. In the fore wings there are 19–20 antenodals and 14 postnodals; in the hind wing 14–15 antenodals and 14–16 postnodals.

A male in the British Museum collection which I consider to be conspecific with the holotype of *G. dentatus* is labelled "35" and "Brazil, Santarem, $\frac{52}{96}$" (Bates). Another male in the same collection, labelled "35" and "Santarem, $\frac{51}{63}$" (Bates) may also belong to the same species, although the anal appendages are not identical with those of the holotype, and the paired longitudinal veins are not so widely separated at the margin of the wing. A female *Gomphoides* also in the British Museum, labelled "35" and "Brazil, Santarem, $\frac{52}{96}$," is more likely to be the female of *G. dentatus* than either of the two females associated with the holotype in the De Selys Collection. It was captured at the same place as the holotype, and the abdomen is similar in the two insects, both as regards general coloration and the dilatation of the penultimate and antepenultimate segments.

The female from Demerara in the MacLachlan Collection doubtfully referred by De Selys to *G. dentatus* (Ann. Soc. Ent. Belg. xxxviii. p. 178, 1894) may very well belong to an undescribed species.

Gomphoides distinguendus, sp. n.

Aphylla dentata b, Ris, Hamburg. Magalhaen. Sammelreise, vii., Odonaten, p. 16 (1904).
Gomphoides dentata, Ris, Mém. Soc. Ent. Belg. xxii. p. 74, fig. 15 (♂ anal appendages, &c.) (1913).

A long series of this species was taken near Buenos Ayres by Dr. F. Ris in December, 1890, and January, 1891, and two males were given by the collector to De Selys Longchamps, who considered them to be conspecific with his *G. dentatus* from the Amazon. When dealing with this species in 1904 Dr. Ris referred to the uncertainty attending its identification, but decided to adopt, provisionally, the name which De Selys had applied to it. At the same time he published a full description of both the sexes, so that future recognition might be facilitated.

I am again indebted to M. Severin for the loan of the two specimens in the De Selys Collection, as well as for drawings and photographs (Pl. VI. figs. 3–5). The study of this material enables one to decide that the Argentine species is quite distinct from the Amazonian one, with which De Selys had confused it. I propose for it the name *distinguendus*, and the type of the new species will be the specimen of which a description and some figures are now published. In the male of *G. distinguendus* the superior anal appendages are bent sharply inwards, and bear a strong triangular tooth internally, instead of being regularly forcipate and provided with an internal swelling. In dorsal view the abdomen is less swollen at segment 8, and the lateral margins of that segment are not at all dilated. The pterostigma is more golden than in the other species and more strongly braced. There is also a venational difference—between the respective holotypes, at all events—for the pairs of parallel veins M_2 and Rs, M_3 and M_4, and Cu_1 and Cu_2 are less widely separated at the margin of the wing. Again, *G. distinguendus* is somewhat smaller than *G. dentatus*, and the coloration of the abdomen is more variegated (in *G. dentatus* the dorsum of segments 3–9 seems to me to be uniformly blackish, although De Selys mentions some pale markings). Finally, the colour-pattern of the thorax is different in the two species, for while *G. dentatus* has five pairs of pale stripes upon the meso-metathorax, the types of *G. distinguendus* have only three pairs. Humeral stripes are certainly absent, and in neither of the Brussels specimens can I perceive the narrow green line on the metepisternum which seems to be indicated by Ris.

Two males from Paraguay have been referred to *G. dentatus* by Dr. Calvert (Ann. Carnegie Mus. vi. p. 219, 1909), but, in the absence of fuller particulars, it cannot be said whether these specimens show any close affinity with *G. distinguendus*, as their habitat would seem to suggest.

♂ (holotype). "Buenos Aires, i. 91" (white label, by Ris), "*Aphylla dentuta*, Selys, ♂, Buenos Ayres, Dr. Ris" (white label, by De Selys), "Buenos Ayres, Dr. Ris" (green label, by De Selys), "118" (pencilled on each of two yellow labels).

Length of abdomen 44 mm.; length of hind wing 33 mm.

Labium, labrum, clypeus, frons, and occiput green or greenish. Antennæ and upper surface of head blackish brown.

Prothorax mostly green, with the anterior and posterior borders yellow. Meso-metathorax greenish brown mid-dorsally, laterally, and ventrally; chestnut-brown at the shoulders; the dorsum carrying a pair of antehumeral broad green stripes, not quite reaching anteriorly the mesothoracic half-collar, which, with the mid-dorsal carina, is also green; another broad green stripe lies upon the mesepimeron, and a narrow stripe of the same colour upon the metepimeron.

Wings hyaline, with a mere trace of yellow at the base of the hind wing. Venation blackish brown; costa anteriorly pale. Pterostigma 5 mm. long, golden yellow, with a distinct brace-vein in all wings. At the margin of the wing two cells between M_2 and Rs, three cells between M_3 and M_4 in the fore wings and two in the hind wings, and four to six cells between Cu_1 and Cu_2. Fore wings with 16–17 antenodals and 10 postnodals; hind wings with 12–14 antenodals and 11–12 postnodals.

Triangle in fore wing 3-celled. Subtriangle of fore wing and triangle of hind wing 2-celled. Subtriangle of hind wing free. One cross-vein in the supertriangle of each wing.

Femora greenish brown; tibiæ and tarsi black.

Abdomen moderately inflated at segments 1–2; somewhat constricted at 3; moderately inflated again at 7–10, fusiform; the inferior lateral margins of 8 and 9 not expanded laterally, and but very little dorso-ventrally; 10 in dorsal view slightly constricted in the middle, the hind margin with a shallow median rounded notch, the inferior lateral margins produced apically. Segments 1–2, with the auricles, greenish brown; 3 mainly greenish brown, black distally; 4–6 black mid-dorsally and distally, with an ill-defined brownish area at each side proximally; 7 light orange-brown in the proximal half, dark orange-brown beyond; 8 and 9 dark orange-brown; 10 yellowish brown. In ventral view segments 1–7 greenish brown; 8–10 deep yellow. Genitalia of segment 2 deeply sunk in the genital fossa, and, being also thickly clothed with hairs, are very difficult to examine.

Anal appendages dark orange-brown, hairy. The upper pair shorter than segments 9 and 10 taken together, divergent for more than half their length, then abruptly convergent; a sharp triangular internal tooth before the inward bend. The lower appendage very short, hairy, triangular, notched at the apex.

The second male (paratype) carries two white labels and a green one, each of them inscribed in the same manner as the corresponding label attached to the holotype. The abdomen measures 45 mm., while the length of the hind wing and pterostigma remains as in the holotype. At the margin of the wing there are three cells between M_2 and Rs in both fore wings and possibly also in the left hind wing, while there are two only in the right hind wing; three cells between M_3 and M_4 in the right fore wing and two cells in the other three wings; four (three wings) to five (one wing) cells between Cu_1 and Cu_2. In the fore wings there are 17–19 antenodals and 10 postnodals; in the hind wings 13–14 antenodals and 12–13 postnodals.

Gomphoides calverti, Kirby, and *Gomphoides camposi*, Calvert.

Cyclophylla calverti, Kirby, Ann. & Mag. Nat. Hist. (6) xix. p. 613, pl. xii. fig. 2 (1897).

Gomphoides camposi, Calvert, Ann. Carnegie Mus. vi. p. 219, pl. vii. fig. 127 (1909).

Each of these species was described from a unique male specimen, the first from N.E. Brazil and the second from Ecuador, and each of the descriptions was accompanied by a single figure. Kirby's figure represented the entire insect, and was of little scientific value, while that given by Calvert was a left profile view of the apical segments of the abdomen. The close relationship subsisting between the two species has hitherto escaped attention, but, upon comparing with Kirby's type (Pl. VI. fig. 6) the anal appendages of *G. camposi*, as figured by Calvert, I found the resemblance to be so strong that I was induced to read the description of *G. camposi* with the type of *G. calverti* before me. Such differences as became apparent did not seem to afford any clear proof of specific distinctness, and correspondence with Dr. Calvert, who was kind enough to re-examine the type of his own species, brought to light no differentiating characters of greater value than the following:—

G. calverti.	*G. camposi.*
(1) Meso-metathorax with a second antehumeral green stripe, about half as long as the first, very narrow, linear in front, almost touching posteriorly the ante-alar ridge, lying a little above the humeral suture.	(1) Meso-metathorax without a second antehumeral green stripe.
(2) The pale basal colour on abdominal segments 4–7 interrupted mid-dorsally, and therefore divided into spots.	(2) The pale basal colour on abdominal segments 4–7 not interrupted mid-dorsally, and therefore not divided into spots.
(3) Expansion of inferior lateral margin of segment 8 smaller, not rounded; that of 9 not very pronounced, parallel and co-extensive with the long axis of the segment.	(3) Expansion of inferior lateral margin of segment 8 larger, strongly convex; that of 9 more pronounced than in *calverti*, regularly convex.
(4) Upper anal appendages with the two inferior processes more obtuse; the superior subapical sinuation longer.	(4) Upper anal appendages with the two inferior processes more acute; the superior subapical sinuation shorter.
(5) Fore wings with 18–19 antenodals, 10–13 postnodals. Hind wings with 13–14 antenodals.	(5) Fore wings with 20–22 antenodals, 13–14 postnodals. Hind wings with 16 antenodals.
(6) Abdomen 37·5 mm.; hind wing 28 mm.	(6) Abdomen 43 mm.; hind wing 32 mm.

It was realized that differences of this description might lose their significance, if sufficient material of both species became available for study, and, with a view to throwing further light upon the question at issue, Dr. Calvert prepared and sent me camera lucida drawings of the penis and accessory genitalia of *G. camposi* (Pl. VII. figs. 8 & 9), for comparison with the corresponding structures in Kirby's type. The hamules did not seem to be conspicuously different, but, when the penis of *G. calverti* came to be dissected out and compared with the figure of *G. camposi*, a state of things was disclosed which removed all reasonable doubts on the score of specific distinctness. The camera lucida drawings reproduced as figs. 7 and 8 show the remarkable difference in form and proportion of each of the three joints of which the penis is composed, and especially the enormous disparity in the length of the lateral lobes of the third joint. The vesicle of the penis, too, is widely different in the two species. It may be pointed out that the drawing of *G. camposi* appears to have been made from the penis extended, but still *in situ*, while that of *G. calverti* was made from the organ after it had been dissected out.

Two typographical errors have been detected by Dr. Calvert in his description of *G. camposi*, and may be corrected here. The first is on page 219, where the width of the antehumeral stripe on the thoracic dorsum appears as "8 mm." instead of "·8 mm.," while the other occurs in line 16 of the next page, where "8" should be read for the second "9."

Zonophora bodkini, sp. n.

1 ♀ (holotype). Tumatumari, R. Potaro, British Guiana, xii. 1915 (*G. E. Bodkin*).

Length of abdomen 58 mm.; length of hind wing 52 mm.

Head moderately large. Labium hairy, brownish; the end-hook of each lateral lobe longer than the movable hook, and considerably overlapping its fellow in the middle line. Hypopharynx not deeply excavated in front. Maxillæ black (Pl. VII. fig. 12). Mandibles black (Pl. VII. figs. 13, 14). Labrum black, with a broad transverse pale band. Anteclypeus pale. Postclypeus and anterior aspect of frons black; the suture dividing them pale. Superior aspect of frons black, with a large pale spot at each side. First and second joints of antennæ black [the more distal joints missing]. Vertex black, with a stout tubercle behind each of the paired ocelli. Occiput black, concave above.

Prothorax rather hairy; on the hind margin a pair of small, rounded, pale dorsal spots, and a pair of larger pale lateral spots.

Meso-metathorax black, with yellow markings. A pair of lines on the dorsum, curving outwards anteriorly, and not reaching the mesothoracic half-collar. A longer line is close to and nearly parallel with the humeral suture. Some ill-preserved markings on the mesepimeron and metepisternum. On the right side is preserved a broad band crossing the metepimeron medially. Some white pubescence on the inferior surface of the thorax and segments 1 and 2.

Wings (Pl. VII. fig. 10) yellowish brown. Costa and other veins black. Antenodals 26–27 in the fore wings and 18 in the hind wings. Postnodals 18–19 in the fore wings and 17–19 in the hind wings. Arculus in the fore wing at the level of the third antenodal; in the hind wing nearer the level of the second. Triangle in fore wing only slightly less elongate than in hind wing. No cubito-anal cross-veins, apart from the anal crossing and the one closing the subtriangle. Anal loop in hind wing apparently containing five cells, but its proximal boundary is ill-defined. Brace-vein more or less before the level of the proximal end of the pterostigma.

Pterostigma broad, 7 mm. long, covering from seven to nearly nine cells, opaque, very dark red. The cells between M_2 and Rs beginning to be doubled at the level of the proximal end of the pterostigma. The trebling of the post-trigonal cells beginning a little before (hind wings) or well before (fore wings) the level of separation of M_{1+2}. Cu_1 and Cu_2 in hind wing rather strongly divergent; five to six cells between them at the wing-margin.

The only leg preserved is a detached one, of moderate length; the coxa and part of the femur pale, the tibia and tarsus black.

Abdomen swollen at base, slightly constricted at segment 3, somewhat dilated laterally at 8 and 9. Black, with yellow markings, as follows:—Sides of segment 1 mostly yellow; a mid-dorsal line and two pairs of large lateral spots on segment 2; a pair of large lateral markings on the proximal half of 3, **Z**-shaped on the left side and formed like an inverted **Z** on the right side, the distal transverse portion of each marking almost touching its fellow on the dorsum; a pair of similar but smaller markings on 4; a pair of large, irregularly-shaped, lateral spots at the base of 5; a pair of large, oblong, dorsal spots, separated by the mid-dorsal carina, at the base of 7; 6, 8, 9, and 10 apparently immaculate. Anal appendages about as long as segments 9 and 10 taken together, convergent, almost straight, ending in a sharp point, black in the basal third, pale yellow beyond. Vulvar lamina (Pl. VII. fig. 11) black and consisting of two strong parallel spines, fused together for more than three-quarters of their length, and gradually tapering towards their distal extremities, which are well separated, pointed, and divergent, and extend a little beyond the apical margin of segment 9. Between the vulvar lamina and the ninth sternite were found a number of orange-yellow ova of the broad exophytic type. These were very small for such a large insect, the length of those measured being ·5–·6 mm., and the width ·3–·35 mm.

The measurements of *Z. bodkini* exceed those of the largest *Zonophora* hitherto described—namely, the unique male of *Z. batesi*, Selys *. It also extends the known range of the genus northwards, as the three older species were all described from Brazil.

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* In the earliest description of the female of *Zonophora campanulata*, Burm. (Bull. Acad. Belg. xxi. (2) p. 80, 1854), De Selys gave the length of the abdomen as 58 mm., which is also the length of the abdomen in the ♀ type of *Z. bodkini*. This figure is obviously a misprint for 50 mm., the measurement stated by the same author in 1858 (Monogr. Gomph. p. 234).

As special facilities existed for doing so, the mouth-parts were examined and compared with the maxilla, hypopharynx, and labium as figured by Hagen for *Z. campanulata* (Monogr. Gomph. pl. xiii. fig. 1, *p*, *q*, *r*). The maxilla is much alike in the two species, and so is the hypopharynx, except that in the genotype it is more deeply excavated anteriorly. As to the labium, the end-hook of the lateral lobes is in the new species longer than the movable hook, whereas in *Z. campanulata* it is shorter than the movable hook. In addition to the maxilla, drawings have been made of the mandible in *Z. bodkini*, and I am not aware that this organ has ever been figured for any nearly related species.

The vulvar lamina in *Z. campanulata* has also been figured by Hagen (*loc. cit.* fig. 1, *t*), and is not so deeply bifid at the apex as in *Z. bodkini*.

The species is dedicated to Mr. G. E. Bodkin, the Government Economic Biologist, British Guiana, and the holotype has been presented by him to the British Museum, through the Imperial Bureau of Entomology.

Zonophora spectabilis, sp. n.

1 ♂ (holotype), Sapucay, Paraguay, 16. i. 1903 (*W. Foster*). No. 64 (British Museum).

Length of abdomen 41 mm.; length of hind wing 34·5 mm.

Head moderately large. Labium greenish yellow; the superior margin of the middle lobe and the internal anterior angle of each lateral lobe black. Base of the mandibles greenish yellow. Labrum greenish yellow, bordered all round with black. Clypeus and frons greenish yellow; the free inferior margins of the postclypeus black. Superior surface of frons with a deep median groove, filled in with black in its posterior two-thirds; a broad black band crossing the frons transversely in its posterior third. Upper surface of head before the occiput black, except for a pale brownish spot behind the median ocellus. Occiput pale brownish.

[Prothorax lost.]

Meso-metathorax chocolate-brown, with five yellow or greenish-yellow stripes on each side of the mid-dorsal crest, increasing progressively in width from above downwards—the first, lying on the dorsum, curved, diverging anteriorly from its fellow, and not quite reaching the mesothoracic half-collar above; the second running parallel with and lying a little above the humeral suture; the third crossing the mesepimeron medially; the fourth occupying the posterior half of the metepisternum, and at about mid-height throwing forward a strongly marked dentiform projection into the dark anterior half; and the fifth crossing the metepimeron medially. The extreme posterior angle of the metepimeron greenish yellow.

Wings (Pl. VII. fig. 15) hyaline. Costa anteriorly golden yellow as far as the pterostigma. Subcosta red. Radius and some, at least, of the succeeding convex veins, seen from above, black. Viewed obliquely from behind, the entire venation, including the costa, appears to be red. Antenodals 19–20 in the fore wings and 12–13 in the hind wings. A basal subcostal cross-vein present in each wing. In the fore wings the second hypertrophied antenodal is the seventh in the series; in the hind wings it is the sixth. Postnodals 10 in the fore wings and 10–11 in the hind wings. Arculus at about the level of the second regular antenodal. One cubito-anal cross-vein, supplementary to the anal crossing and the one closing the subtriangle, in right fore wing and in each hind wing; not present in left fore wing. Anal triangle in hind wing containing from four to five cells, and the anal loop five cells. Pterostigma with a weak brace-vein, very broad, 4·5 mm. long, surmounting from four and a half to nearly six of the cells below, opaque, very dark red, bounded by black veins. The cells between M_2 and Rs beginning to be doubled beyond the level of the proximal end of the pterostigma. The trebling of the post-trigonal cells beginning a little after the level of separation of M_{1+2}. Cu_1 and Cu_2 in hind wing not strongly divergent; three to four cells between them at the wing-margin.

[Fore legs missing.] Mid legs black. Femur of hind leg blackish below; above greenish yellow, with two dark longitudinal lines. [Tibia and tarsus missing.]

Abdomen: ground-colour of segments 1 and 2 chocolate-brown, of segments 3–10 black. Each segment marked with yellow or greenish yellow, as follows:—1 with a band on the basal margin and a broader ring on the apical margin; 2 with a broad median stripe, expanding apically into a narrow ring; 3–6 with a basal ring, occupying more than a third, but less than a half, of the segment; 3 with a large and 6 with a small lateral spot on each side of the segment, beyond the ring; 7 with the basal half yellow, the ring strongly produced into the apical half laterally; 8 and 9 with a broad basal ring, strongly produced towards the apex of the segment medially and laterally; 8 with a few black denticles on the dorsal carina; 10 chiefly yellow. Auricles yellow.

Posterior hamules very prominent, long, black, densely clothed with pale hairs in the distal half; in profile view broad, convex ventrally, and ending in a long straight point; in ventral view widely separated basally, converging and expanding internally until they nearly touch one another at about mid-length, and then narrowing to form a pair of rather slender forceps. Vesicle of the penis black, rather hairy, stout; the extremity directed backwards. Upper anal appendages yellow, hairy, about as long as segments 9 and 10 taken together, broad in the first two-thirds of their length, then narrowing and curving towards one another until they meet or even overlap; a low superior tubercle at the broadest part of the appendage is followed by an internal expansion which terminates posteriorly in an acute tooth, directed inwards and forwards. Lower anal appendages black, about two-thirds as long as the superior appendages, strongly divergent at their base, and then curving gently inwards, and ending in a sharp hook.

Zonophora spectabilis presents several points of difference from the genotype and other members of the genus. It has a more southern distribution than any other species yet described, and is further distinguished from all its congeners by the presence of pale spots on segments 8, 9, and 10 of the abdomen. It is likewise the smallest of the known species of *Zonophora*, and in this respect comes nearest to *Z. calippus*, Selys. Indeed, *Z. calippus* and *Z. spectabilis* are differentiated from the more typical forms in other ways, for they share in common certain venational peculiarities from which the larger species are excluded. For instance, they agree with one another and differ from *Z. campanulata* in the presence of a basal subcostal antenodal in all wings, and in the normal presence of a supplementary cubito-anal cross-vein, in addition to the anal crossing and the base of the subtriangle. In the absence, however, of marked differences in the general design of the external genitalia and anal appendages, it seems advisable to treat *Z. spectabilis* and *Z. calippus* as being congeneric with *Z. campanulata*.

EXPLANATION OF THE PLATES.

PLATE VI.

Fig. 1. *Gomphoides dentatus*, Selys, ♂, type. Right wings. G. Severin photo.

Fig. 2. Ditto. Anal appendages in dorsal view. G. Severin photo.

Fig. 3. *Gomphoides distinguendus*, sp. n., ♂, type. Right wings. G. Severin photo.

Fig. 4. Ditto. Anal appendages in dorsal view. G. Severin photo.

Fig. 5. Ditto. Terminal segments of abdomen and anal appendages in dorsal and left profile view. G. Severin del.

Fig. 6. *Gomphoides calverti*, Kirby, ♂, type. Terminal segments of abdomen and anal appendages, in left profile view. P. Highley cam. luc. et del.
Fig. 7. Ditto. Penis and its vesicle, in left profile view. P. Highley cam. luc. et del. *c*, second joint of penis; *d*, vesicle of penis.

PLATE VII.

Fig. 8. *Gomphoides camposi*, Calvert, ♂, type. Penis and its vesicle, in left profile view. P. P. Calvert cam. luc. et del. *c*, second joint of penis; *d*, vesicle of penis.
Fig. 9. Ditto. Genitalia of second abdominal segment, in left profile view. P. P. Calvert cam. luc. et del. *a*, anterior hamule; *b*, posterior hamule; *c*, second joint of penis; *d*, vesicle of penis.
Fig. 10. *Zonophora bodkini*, sp. n., ♀, type. Left wings. F. W. Campion photo.
Fig. 11. Ditto. Vulvar lamina. H. Knight del.
Fig. 12. Ditto. Maxilla. H. Knight del.
Fig. 13. Ditto. Mandible, external view. H. Knight del.
Fig. 14. Ditto. Mandible, internal view. H. Knight del.
Fig. 15. *Zonophora spectabilis*, sp. n., ♂, type. Left wings. F. W. Campion photo.

XVIII.—*An interesting new Genus of* Aviculariidæ. By MELLO-LEITÃO, M.D., Fellow of the Brazilian Society of Sciences.

AMONGST the abundant material of large Brazilian Mygales from the Museum of Natural History at S. Paulo, I have found one very interesting species, collected at Marianna, Estado de Minas Geraes, by Mr. José Pinto da Fonseca, which is the type of the new genus described below.

ANCYLOCHIROS *, gen. nov.

Type, *A. taunayi*, sp. n.

Cephalothorax low, a little longer than wide, the central fovea deep, transverse. The ocular tumulus not much broader than long. The anterior row of eyes strongly procurved, the anterior edge of the medians being behind the posterior edge of laterals; eyes nearly evenly spaced and subequal. Posterior medians much smaller than the anterior medians; posterior laterals about as large as the anterior laterals.

Labium much broader than long, with the tip densely studded with cusps. Coxa of pedipalps with a very cuspulose basal area.

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* *ἀγκύλος*, curved; *χείρ*, hand; an allusion to the shape of the palp-tarsus in female.

Sternum a little longer than wide, with conspicuous posterior sigillæ, separated from the margin by nearly the same distance which divides them.

Legs 4, 1, 2, 3 without spines; the tarsal scopula of legs I., II., and III. entire, of IV. with a narrow longitudinal band of spiniform bristles. There are no stridulating bristles.

Palpal tarsus (in female) very bowed at the base; beyond much depressed, a little hollow, with dorsal series of small spines.

Male unknown.

This genus is intermediate between the Ischnocoleæ and Avicularieæ, Simon. From the Avicularieæ it differs in the position of the posterior sternal sigillæ (marginal or submarginal in all the Avicularieæ) and in having the posterior tarsal scopula divided by a longitudinal band of spiniform bristles. It is distinguished from the Ischnocoleæ by the unarmed legs. From *Phlogiodes*, Pocock (to which, by the position of sternal sigillæ, it is perhaps allied), it differs in having the thoracic central fovea straight (strongly procurved in *Phlogiodes*) and the anterior row of eyes strongly procurved (only a little in *Phlogiodes*). From all the Aviculariidæ it differs by the anomalous form of palpal tarsus.

Genotype:

Ancylochiros taunayi [*], sp. n.

♀.—34 mm.

Cephalothorax very dark red-brown mahogany, clothed with dark pubescence. Cheliceres dark red-brown; fang-groove with eight black teeth on the inner margin and with long pink hairs. *Sternum* and *coxæ* of the legs black, densely hairy; *labium* and *coxæ* of pedipalps a little lighter. Legs dark red-brown, with long rust-coloured hairs. *Abdomen* black; the dorsum with three pairs of large, oblique, rusty spots. The whole abdomen with long, semierect, rust-coloured hairs; ventral area and spinnerets velvety black.

Carapace a little longer than wide, as long as tibia + patella I. or IV. and metatarsus + tarsus IV., longer than metatarsus + tarsus I.

Anterior eyes equal, in a row and strongly procurved. Posterior medians much smaller than anterior medians, separated from the anterior medians and posterior laterals by about a diameter.

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[*] I have much pleasure in naming this form in honour of Dr. A. de Taunay, Savant Director of the São Paulo Museum, at Ypiranga.

Legs unarmed (38, 35, 34, and 41 mm.). Metatarsus I. and II. scopulated almost to base; metatarsus III. in the apical two-thirds; IV. without scopula.

Palpal tarsus strongly bowed at basal third; beyond curved, hollow, depressed, with three longitudinal series of little black cuspids.

Hab. Marianna (Estado de Minas Geraes). Coll. José Pinto da Fonseca.

Type. A female, in the collections of the S. Paulo Museum.

XIX.—*Rhynchota from New Caledonia.*

By W. L. Distant.

This collection of Rhynchota was made during the expedition to New Caledonia during the whole of 1914 by Mr. P. W. Montague and Prof. R. H. Compton to investigate the fauna and flora of this most interesting French colony *. The expenses of the expedition were largely defrayed by grants from the Royal Society, the Percy Sladen Trust Fund, and the Worts Fund of the University of Cambridge.

Prof. R. H. Compton subsequently presided at the Botanical Gardens, Cape Town, S.A., but Mr. Montague was a victim in the late great war. I am informed by Mr. Hugh Scott, of Cambridge, that "Montague went over a trench in Macedonia and was never heard of again."

The whole of the Rhynchotal collection is now contained in the British Museum.

Part I.

HETEROPTERA.

Fam. Pentatomidæ.

Subfam. *Scutellerinæ.*

Genus Coleotichus, White †.

Coleotichus costatus.

Coleotichus costatus, Fabr. Mant. ii. p. 282 (1787).

Hab. Mt. Dore, Noumea.

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* 'The Geographical Journal,' xlix. p. 81 (1917).

† *C. artensis*, Montr. (*Scutellera artensis*), A. S. Linn. Lyon. v. p. 259 (1858), is also contained in the Brit. Mus. from both New Caledonia and Moreton Bay, Australia, but is not included in this collection nor in the one made by Sarasin and Roux which I previously worked out (Nov. Caled. Zool. i. L. iv. 10 (1914).

Genus Tectocoris, Hahn.

Tectocoris lineola.

Cimex lineola, Fabr. Spec. Ins. ii. p. 340 (1781).

Hab. Mt. Dore, Baie Ngo.

Philia caledonica, sp. n.

Dull reddish ochraceous; head, antennæ, anterior area of pronotum, about anterior half of scutellum (excluding lateral margins), head and body beneath, tibiæ and tarsi black or blackish; anterior area of pronotum and basal area of scutellum with metallic greenish reflections; antennæ with the first and second joints shortest, fourth and fifth longest; a transverse series of punctures defining the short, slightly raised, anterior area of the pronotum; the whole upper surface more or less very finely punctate; rostrum very dark testaceous and extending to base of abdomen; legs somewhat strongly marginally hirsute.

Long. 13 mm.
Hab. Baie Ovemo.

Philia geminata, sp. n.

Body above dark shining indigo-blue, finely and thickly punctate; basal marginal areas of pronotum and scutellum (excluding their centres) shaded with metallic shining blue and green, a transverse shining reddish-ochraceous fascia broken in the middle, but each part margined with metallic bluish green, crossing scutellum a little behind middle, and a similarly coloured spot near apex; body beneath indigo-blue; a transverse ochraceous fascia at base of head between eyes; coxæ, trochanters and femora, and lateral margins of abdomen—inwardly indented on each segment—bright reddish ochraceous; rostrum slightly passing the posterior coxæ; antennæ black, first and second joints shortest and subequal in length, third and fourth also subequal, fifth longest; pronotum concavely impressed on each side at base, and scutellum elongately impressed on each side before middle.

Long. 14 mm.
Hab. Baie Ovemo.

Chrysocoris sexmaculatus.

Scutellera sexmaculata, Leach, Zool. Misc. ii. p. 36, pl. xiv. (1815).

Hab. Noumea.

Subfam. *CYDNINÆ.*

Genus HAHNIA, Ellenr.

Hahnia australis.

Hahnia australis, Erichs. Faun. Vandiem., Arch. für Naturg. 8, p. 275 (1842).

Hab. Mt. Mou.

Subfam. *PENTATOMINÆ.*

NEOSURENUS, gen. nov.

Allied to *Surenus*, Dist., from Burma*, but differing in the following characters:—Head with the lateral lobes much onger than the central lobe, but with their apices obliquely ounded, not obliquely subtruncate; antennæ with the first joint not reaching apex of the head, the second and third joints and the fourth and fifth joints subequal in length; lateral angles of the pronotum not subprominent but obliquely rounded, the lateral margins not dentate and almost straightly oblique; corium with the lateral margins reaching and moderately passing the margins of the connexivum, which are entire and not angulated at the segmental incisures; stigmatal spots to the abdomen very distinct and tuberculous.

Neosurenus montaguei, sp. n.

Above ochraceous, thickly and more darkly punctate; eyes prominent and black; membrane pale fuscous, with dark longitudinal veins; head beneath ochraceous, with a broad transverse fascia of black punctures between the eyes; sternum ochraceous, thickly darkly punctate, black at the coxal basal areas, the lateral margins a little paler; abdomen beneath thickly darkly punctate, stigmatal spots black, connexivum both above and beneath ochraceous, beneath with darker mottlings; legs and rostrum ochraceous, the latter reaching the intermediate coxæ; antennæ ochraceous, apical joint blackish but ochraceous at base; other characters as in generic diagnosis.

Long. 12½ mm.

Hab. Mt. Panié.

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* Tr. Ent. Soc. Lond. 1901, p. 106; Faun. Brit. Ind., Heteropt. i. p. 116, fig. 61, p. 117.

Polycarmes punctatissimus.

Acanthidium punctatissimum, Montr. Ann. Soc. Linn. Lyon. v. p. 245 (1858).

Hab. Mt. Mou, Houadou R., near Dumbea, Panié.

Eurinome inconspicua.

Pentatoma inconspicua, Montr. Ann. Soc. Linn. Lyon. v. p. 249 (1858).

Hab. Mt. Mou, Central District.

Halyomorpha canalana.

Halyomorpha canalana, Dist. in Sarasin and Roux, Nov. Caled. Zool. i. L. iv. no. 10, p. 374, pl. xii. fig. 7 (1914).

Hab. Mt. Panié, near Dumbea.

Genus STENOZYGUM, Fabr.

Stenozygum flavifrons.

Stenozygum flavifrons, Dist. in Sarasin & Roux, New Caledonia, Zool. vol. i. L. iv. no. 10, p. 375, pl. xi. fig. 2 (1914).

Hab. Ba Bay.

Genus CUSPICONA, Dall.

Cuspicona viridis.

Cuspicona viridis, Montr. Ann. Soc. Phys. (2) vii. p. 98 (1855).
Cuspicona zeloma, Kirk. Cat. Hem. Het. p. 143. 20 (1909).

Hab. Central District, Houadou.

Many specimens of this species are ochraceous and may be considered as either discoloured or variable forms.

Genus MORNA, Stål.

Morna leucospila.

Morna leucospila, Walk. (*Cuspicona*) Cat. Hem. Het. ii. p. 387 (1867).

Hab. Mt. Ignambi.

Genus VITELLUS, Stål.

Vitellus auricornis.

Vitellus auricornis, Walk. (*Cuspicona*) Cat. Hem. Het. ii. p. 387 (1867).

Hab. Mt. Koghi, Central District.

Genus PEGALA, Stål (nec Bergr. Ann. Soc. Ent. Belg. lviii. p. 143, 1914).

Pegala lævis.

Pegala lævis, Berg. Rev. Ent. xiii. p. 152 (1894).
Pegala figulina, Dist. Ann. & Mag. Nat. Hist. (8) vi. p. 590 (1910).

Hab. New Caledonia; Baie Ovemo. Queensland.

In describing this species from Australia I had not thought it necessary to consult Bergroth's description of his species from New Caledonia. The British Museum has now examples from both localities. The species, however, varies in length, some small specimens only attaining a length of 11 mm.

Pegala virens, sp. n.

Head, pronotum, scutellum, and corium virescent, basal marginal area of pronotum more or less testaceous, head and apical area of scutellum pale ochraceous; membrane greyish brown; body beneath and legs pale greenish, rostrum and a basal spot to abdomen dark testaceous; antennæ dark ochraceous, joints (excluding first) almost subequal in length, but fourth and fifth a little stoutest; pronotum, scutellum, and corium thickly coarsely punctate, head more finely punctate; body beneath finely and obscurely punctate; abdomen centrally, finely, longitudinally ridged.

Long. 10 mm.

Hab. Plaine des Lacs.

Pegala flavescens, sp. n.

Bright ochraceous; lateral lobes of head, pronotal margins, a central, narrow, longitudinal fascia, and subapical area to scutellum, and the corium paler and more stramineous; body beneath (excluding rostrum, legs, and metasternum) paler and stramineous; antennæ stramineous, extreme apices of joints and the whole of fifth joint a little darker in hue, second and third joints a little longest and subequal, fourth and fifth a little shorter and subequal in length; eyes black; ocelli small and dark castaneous; pronotum (excluding margins) coarsely punctate, basal lateral angles short, recurved, and sanguineous; scutellum sparingly but distinctly punctate; corium more finely and more thickly punctate; membrane shining greyish and moderately passing the abdominal apex, which beneath is armed with four short but robust longitudinal spines; rostrum reaching the posterior coxæ.

Long. 12 mm.

Hab. Noumea.

Subfam. *ASOPINÆ.*

Genus ANDRALLUS, Bergr.

Andrallus spinidens.

Cimex spinidens, Fabr. Mant. Ins. ii. p. 285 (1787).

Hab. Central District.

Genus EALDA, Walker.

Ealda minax.

Ealda minax, Walk. Cat. Het. ii. p. 409 (1867).

Hab. Mt. Mou.

Genus PLATYNOPUS, Amy. & Serv.

Platynopus melacanthus.

Platynopus melacanthus, Boisd. Voy. Astrol., Ent. ii. p. 628, pl. ii. fig. 7 (1835).

Hab. Central District.

Fam. **Coreidæ.**

Subfam. *COREINÆ.*

Genus MICTIS, Leach.

Mictis profana.

Mictis profana, Fabr. Syst. Rhyng. p. 211 (1803).

Hab. Mt. Mou, Noumea.

Subfam. *ALYDINÆ.*

Genus MIRPERUS, Stål.

Mirperus curvidens.

Mirperus curvidens, Montr. Ann. Soc. Linn. Lyon, (11) v. p. 254 (1858).

Hab. Central District, Mt. Mou.

Subfam. *CORIZINÆ.*

Genus SERINETHA.

Serinetha isolata.

Serinetha isolata, Dist. Ann. & Mag. Nat. Hist. (8) xiii. p. 179 (1914).

Hab. Mt. Noumea.
Originally described from the Marshall Islands.

RANTURRA, gen. nov.

Body long, narrow and elongate; head distinctly longer than broad, produced beyond the antenniferous tubercles, the lateral lobes distinctly bifidly separate at apices, two distinct ocelli near base and between lower margins of eyes; antennæ with the basal joint longer and more robust than the other joints; rostrum with the basal joint not extending much beyond the middle of head, almost in a line with posterior margins of eyes, apex about reaching the intermediate coxæ; scutellum elongate, longer than broad, lateral margins obliquely straight; membrane a little longer than corium, but not reaching abdominal apex; legs long and slender, femora and tibiæ almost equal in length, the femora distinctly stouter than the tibiæ; tarsi with the basal joint much the longest.

Allied to *Turrana*, Dist., from Queensland, but differing from that genus by the much more slender antennæ, much more elongate head, and longer and more slender legs, &c.

Ranturra attenuata, sp. n.

Head, pronotum, scutellum, and corium brownish ochraceous, the pronotum, scutellum, and corium thickly, finely, darkly punctate, the anterior margin of the pronotum usually narrowly pale sanguineous; membrane shining metallic brown; abdomen above as seen beyond apex of membrane more or less piceous, the lateral margins ochraceous; body beneath and legs ochraceous; sternum thickly, somewhat coarsely punctate.

Long. 11–12 mm.

Hab. Central area of New Caledonia and Houadou R.

CRISTOVALLIA, gen. nov.

Body moderately elongate; head large, about as long as breadth at base (including eyes, which are large and prominent), lateral margins anteriorly narrowed and concavely sinuate, central lobe prominent but not passing apex of head; antenniferous tubercles stout and prominent; antennæ with the basal and apical joints stoutest, second and third slender, second longest; rostrum reaching base of abdomen, first joint scarcely passing base of head; mesosternum centrally incised; pronotum a little shorter than broad, obliquely, straightly deflected from near base to apex, lateral margins straightly narrowing to apex, lateral angles prominent; scutellum subtriangular; corium and membrane subequal in length; legs moderately slender, femora and tibiæ subequal in length, the femora moderately and equally thickened for their own length.

The length and shape of the head denotes affinity with the genera *Clavigralla* and *Ceraleptus*.

Cristovallia typica, sp. n.

Head testaceous brown, lateral margins before and behind eyes ochraceous, eyes dark castaneous; ocelli at base purplish red; antennæ with the first, second, and third joints pale castaneous, their extreme apices and the fourth joint (excluding a pale basal annulation) black, basal joint stoutest and moderately curved; pronotum ochraceous, its basal margin dark castaneous; scutellum ochraceous; corium and membrane dark castaneous, their lateral margins ochraceous; body beneath and legs ochraceous; pronotum thickly coarsely punctate, the basal angles subacutely straightly prominent; corium thickly punctate; sternum thickly coarsely punctate.

Long. 12 mm.

Hab. Baie Ovemo.

Fam. Lygæidæ.

Subfam. *LYGÆINÆ.*

Genus LYGÆUS, Fabr.

Lygœus hospes.

Lygœus hospes, Fabr. Ent. Syst. iv. p. 150 (1794).

Hab. Mt. Mou.

Genus ONCOPELTUS, Stål.

Oncopeltus rubromarginatus, sp. n.

Body above, antennæ, and legs black; connexivum, sternum, and abdomen beneath sanguineous; antennæ moderately stout, basal joint only just passing apex of head, second joint longer than third, fourth stoutest, about as long as second joint; body depressed; pronotum with the basal angles a little posteriorly produced, a faint, central, longitudinal carination and a much stronger transverse subapical carination, the surface somewhat coarsely punctate; scutellum slightly tumescent and broadly, centrally, longitudinally carinate; corium with the veins very prominent, membrane reaching abdominal apex, the venation distinctly prominent; rostrum almost unseen in *carded* type.

Long. 7 mm.

Hab. Central District.

Nysius caledoniæ, sp. n.

Head, pronotum, and scutellum ochraceous, somewhat thickly darkly punctate; eyes and an elongate spot near their inner margins, a narrow transverse fascia near anterior margin of pronotum, basal margin, a central longitudinal line and basal angles to same, basal margin, and a central longitudinal line to scutellum black; antennæ ochraceous, first and fourth joints and extreme apices of second and third joints distinctly darker, sometimes blackish in hue; corium dull pale ochraceous, membrane greyish white; body beneath and legs dull ochraceous, femora blackly punctate, apices of tarsal joints black; second and fourth joints of antennæ longest and subequal in length, basal joint shortest and with the fourth joint stoutest; basal area of abdomen beneath and large maculations to sternum black; rostrum about reaching posterior coxæ; three small linear black spots on apical margin of corium.

Long. 4–4½ mm.

Hab. Central District; Gondé.

Allied to *N. delectus*, Buch. White, from the Sandwich Islands.

Subfam. *Blissinæ.*

Genus Macropes, Motsch.

Macropes montaguei, sp. n.

Head and pronotum black, apex of the first and basal third of the second pale testaceous, scutellum testaceous; corium stramineous; membrane greyish, the veins blackish; head and sternum beneath blackish, abdomen and legs sanguineous; central lobe of head distinctly projecting; antennæ with the fourth and second joints longest, first joint not quite reaching apex of head; corium and membrane short, the latter only just passing the base of the fourth abdominal segment; anterior and intermediate femora distinctly incrassated, the first spinous beneath.

Long. 6½–7 mm.

Hab. Plaine des Lacs.

Subfam. *Geocorinæ.*

Genus Neocypus, Dist.

Neocypus variegatus.

Ocypus variegatus, Montr. Ann. Soc. Ent. Fr. (4) iii. p. 68 (1861).

Hab. Mt. St. Arago; Mt. Ignambi.

Neocypus scutellatus, sp. n.

Head ochraceous, finely darkly punctate, the stylated eyes pale castaneous, their bases ochraceous; antennæ ochraceous; apices of the first, second, and third joints and the whole of the fourth joint black; pronotum ochraceous, coarsely thickly punctate, the margins and a central longitudinal line pale levigate ochraceous, a prominent black spot on each basal angle and two similar spots near anterior margin; scutellum ochraceous, thickly and more darkly punctate, a central pale levigate longitudinal line extending from apex to about one-third from anterior margin, where it bifurcates towards the basal angles, which are black; corium pale ochraceous, the clavus distinctly darker in hue, an angulate elongate black line extending from about the apical third of costal margin to near middle of apical margin, and the apical angles black, a prominent black spot at apex of membrane; legs very pale ochraceous; femora blackly punctate, more densely so near apices, extreme apices of tibiæ and apices of tarsal joints black; antennæ with the first, second, and third joints ochraceous, their apices and the whole of the fourth joint black or dark fuscous, second joint longest, third and fourth joints subequal in length; body beneath imperfectly seen in carded specimens.

Long. 4½–5½ mm.

Hab. Central District; Mt. St. Arago and Rhoo Houadou R.

Neocypus minor, sp. n.

Head ochraceous, obscurely, thickly, finely punctate, the punctures not darkened, a small central black spot near apex, the stylated eyes reddish castaneous, their bases ochraceous; antennæ ochraceous, the extreme apices of the first, second, and third joints and the whole of the fourth joint black; pronotum somewhat short and broad, coarsely, thickly, blackly punctate, a transverse levigate, slightly raised, ochraceous fascia near anterior margin and a similar fascia at basal margin, a minute black spot at basal angles; scutellum ochraceous, thickly and more darkly punctate, a central, pale, narrow, longitudinal, levigate line extending throughout its entire length, and a similar levigate angular spot at each basal angle, well separated from the central line, basal angles concolorous, not black; corium pale ochraceous, the clavus thickly blackly punctate, the discal area more darkly ochraceous in hue; membrane pale hyaline, reflecting the darker abdomen beneath; legs pale ochraceous, femora not blackly punctate; antennæ with the first, second, and third joints ochraceous, their extreme apices and the whole of the fourth joint black, second joint longest, third distinctly shorter than fourth; body beneath imperfectly seen in carded specimen.

Long. 4½ mm.

(No precise locality given.)

The shorter and broader pronotum and the absence of the prominent black spots near anterior margin of same will alone distinguish this species from *M. scutellatus*.

Neocypus montanus, sp. n.

Head, pronotum, and corium dark purplish red; head and pronotum more or less densely greyishly pubescent, apex of head black, eyes castaneous, their bases pale stramineous; antennæ castaneous, second joint longest, fourth mutilated; scutellum pale shining greyish white, extreme base and apex dark purplish red; membrane pale semihyaline, reflecting the dark abdomen beneath; body beneath purplish red; head beneath, large marginal spots to sternum, and broad abdominal segmental margins creamy white; legs ochraceous, the tarsi testaceous; rostrum purplish red, but imperfectly seen in carded specimen.

Long. 6½ mm.

Hab. Mt. S. Arago.

Genus NEOGERMALUS, Montand.

Neogermalus membraneus.

Opthalmicus membranæus, Montr. Ann. Soc. Ent. Fr. 1861, p. 67.
Neogermalus membraneus, Montand. Bull. Ac. Roum. ii. p. 50 (1913).
Neogermalus membranæus, Montand. Bull. Ac. Roum. ii. p. 51 (1913).
Germalus montandoni, Bergr. Roy. Soc. Victoria, xxix. (n. s.) pt. 1, p. 36 (1916).

Subfam. *OXYCARENINÆ.*

Genus OXYCARENUS, Fieb.

Oxycarenus luctuosus.

Oxycarenus luctuosus, Montr. Ann. Soc. Ent. Fr. 1861, p. 67.

Hab. Noumea.

Genus LACHNOPHOROIDES, Dist.

Lachnophoroides luteovaria, sp. n.

Head and pronotum black; lateral margins of the head in front of eyes greyish white; posterior area of pronotum with three longitudinal ochraceous lines and a spot of the same colour near middle of lateral margins; scutellum black; corium black, claval area, base, some small discal spots, and inner apical margin reddish ochraceous; membrane black, with irregular dark ochraceous spots; body beneath—imperfectly seen in carded type—pale castaneous; femora and tibiæ black, their apices and the tarsi pale ochraceous; antennæ with the first and second joints ochraceous, third and fourth joints piceous, first considerably passing apex of head, second a little longest, fourth a little shorter than third; pronotum transverse, about as long as broad at base, transversely impressed behind middle; femora incrassate, anterior femora more strongly so, spined beneath, more longly so near apices.

Long. 5 mm.

Hab. Central District.

Subfam. *APHANINÆ.*

Cligenes niveomaculatus, sp. n.

Body above dull sanguineous; eyes black; a spot on each lateral margin of pronotum, the same on lateral margins of scutellum near base, and two smaller spots at apical margins of same, a small basal marginal spot to corium, and a larger spot margined with black beyond middle white, narrowly margined with black; apical margins of corium narrowly ochraceous; membrane black; body beneath sanguineous; legs ochraceous; antennæ ochraceous, apical joint piceous, first, third, and fourth joints subequal in length, second joint a little longest; pronotum medially transversely impressed.

Long. 2½ mm.

Hab. Houadou.

Genus LETHÆUS, Dall.

Lethæus tenebrosus.

Lethæus tenebrosus, Dist. in Nov. Caled. Zool. i. L. iv. no. 10, p. 382, pl. xii. fig. 4 (1914).

Hab. Heinghene.

Lethæus aurantiacus.

Lethæus aurantiacus, Dist. in Nov. Caled. Zool. i. L. iv. no. 10, p. 382, pl. xii. fig. 5 (1914).

In the specimens received from the Montague collection the castaneous areas of the femora and antennæ are ochraceous.

Hab. Carovin and Central Districts.

MIRRHINA, gen. nov.

Head acuminate, more than half the length of pronotum, acuminately produced in front of eyes; antennæ with the basal joint longly passing apex of head, first and second joints longest and almost subequal in length, third and fourth joints shortest; rostrum about reaching the intermediate coxæ, first joint not reaching base of head; pronotum finely transversely constricted, the anterior lobe shorter than the posterior, lateral margins sinuate; scutellum somewhat large and long, the apex subacute; corium a little longer than membrane, the latter with the veins more or less reticulate; legs with the femora a little thickened, but not distinctly incrassate; membrane slightly passing abdominal apex *.

Mirrhina albicollis, sp. n.

Head dark castaneous, eyes black; antennæ with the first and second joints ochraceous, third and fourth joints piceous; pronotum with the anterior collar pale ochraceous, the anterior lobe castaneous, the posterior lobe brownish ochraceous, darkly punctate, with darker longitudinal lines; scutellum piceous, the lateral margins and apex ochraceous; corium ochraceous, darkly punctate, usually with a small greyish-white spot, the apical margin narrowly piceous; membrane dull ochraceous, with darker margins and a central longitudinal dark line; legs ochraceous; other structural characters as in generic diagnosis.

Long. 4–4½ mm.

Hab. Houadou, Mt. St. Arago.

Fam. **Pyrrhocoridæ.**

Genus DYSDERCUS, Amy. & Serv.

Dysdercus sidæ.

Dysdercus sidæ, Montr. Ann. Soc. Ent. Fr. 1861, p. 68.

Hab. Central District, Houadou R., Mt. Mou, Mt. Dore.

Fam. **Tingididæ.**

Division CANTACADERARIA.

CORINTHUS, gen. nov.

Head about as long as breadth between eyes, a long, slightly recurved, and upwardly directed spine in front of each eye; antennæ inserted near middle of the lateral margins of the head, basal joint robust, longer than broad, second joint shorter than first and only moderately incrassated, third joint very long and slender, fourth moderately incrassated, a little longer than first; rostrum imperfectly seen in carded specimens; pronotum with the lateral margins moderately laminate and upwardly recurved; scutellum a little longer than broad; hemelytra reticulated, with the areas distinct.

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* From the descriptions the species *Lygæus pulchellus*, Montr., and *Lygæus biguttatus*, Montr. (Ann. Soc. Linn. Lyon, v. p. 255, 1858), appear to also belong to this genus.

Allied to *Gonycentrum*, Fieb., but differing by the much larger and more elongate scutellum, which is centrally and laterally longitudinally strongly carinate.

Corinthus typicus, sp. n.

Stramineous, the lateral areas of the pronotum and the lateral and apical areas of the hemelytra paler in hue; apical joint of the antennæ black, with its extreme base stramineous; pronotum with two ochraceous slightly conically raised spots near middle, divided by a central longitudinal carination; there is also a less continuous longitudinal carination on each lateral area, the lateral areas laminately upturned and more largely and prominently reticulate; scutellum prominently and laterally longitudinally carinate; lateral and apical areas of the hemelytra more prominently and largely reticulate, as in the pronotum.

Long. 3½ mm.

Hab. Houadou.

Compseuta signata, sp. n.

Head black; antennæ ochraceous, apical joint (excluding extreme base) black; pronotum ochraceous, with two spots behind head and two elongate spots near apex black, the anterior margin narrowly and the apex more prominently pale ochraceous; legs ochraceous; elytra pale ochraceous, the margins of the cells on about basal third black; costal area of the elytra moderately ampliate, the pronotum laterally convexly narrowed behind eyes; first joint of antennæ about twice the length of second joint, third joint much the longest; pronotum laterally concavely narrowed behind eyes.

Long. 4 mm.

Hab. Paompai.

NOBARNUS, gen. nov.

Antennæ slender, finely pilose, first and second joints short and incrassate, second much shorter than first, third very long and slender, fourth only about as long as first; head short, transverse; eyes not separated from anterior margin of pronotum; pronotum with the anterior margin truncate, the anterior angles not prominent, somewhat broadly rounded, slightly laterally ampliate, centrally longitudinally tricarinate, the carinations straight; elytra with the costal area non-ampliate, but narrow, the areolets small.

Allied to *Compseuta*, Stål, but differing by the non-ampliated costal area of the elytra, the pronotum not laterally concavely narrowed behind eyes, &c.

Nobarnus typicus, sp. n.

Head black, antennæ ochraceous, the apical joint (excluding extreme base) black; pronotum black, the lateral margins, apex, and three discal longitudinal lines pale ochraceous; elytra pale ochraceous, the basal and apical areas broadly piceous and very narrowly connected by a longitudinal series of darker cells; abdomen above shining black; body beneath imperfectly seen in carded specimen; anterior and intermediate legs ochraceous; structural characters as in generic diagnosis.

Long. 4 mm.

Hab. Mt. Arago.

Fam. **Aradidæ.**

Subfam. *BRACHYRHYNCHINÆ.*

Phlœobia sayi.

Phlœobia sayi, Montr. Ann. Soc. Linn. Lyon, (2) xi. p. 236 (1865).

Hab. Dumbea.

Ctenoneurus lifuanus.

Ctenoneurus lifuanus, Montr. Ann. Soc. Ent. Fr. 1861, p. 69.

Hab. Noumea.

Fam. **Hydrometridæ.**

Subfam. *VELIINÆ.*

Rhagovelia nigricans.

Rhagovelia nigricans, Burm. Handb. Ent. ii. p. 213 (1835).

Hab. Near Dumbea, Mt. Mou, Ignambi.

Subfam. *Gerrinæ.*

Gerris luctuosa.

Gerris luctuosa, Montr. Ann. Soc. Linn. Lyon, xi. p. 242 (1864).

Hab. Central District, Mt. Mou.

Halobates germanus.

Halobates germanus, Buch. White, Rep. Voy. 'Challenger,' Zool. vii. p. 50, pl. i. fig. 6 (1883).

Hab. Bâ Bay, Noumea.

Halobates flaviventris.

Halobates flaviventris, Esch. Entomograph. i. p. 109, t. xi. fig. 5 (1822); Buch. White, Rep. Voy. 'Challenger,' Zool. vii. p. 55, t. xi. fig. 2 (1883).

Hab. Bay of Prony; Kaouakoué Bay; Bâ Bay; Noumea. Apparently a variable species.

Fam. Reduviidæ.

Subfam. *Emesinæ.*

Ploiariola babayana, sp. n.

Head, pronotum, and scutellum pale ochraceous; eyes black, lateral margins of pronotum black; abdomen above pale testaceous, basal area black; body beneath and legs ochraceous, anterior femora with three broad dull testaceous annulations; apices of the intermediate and posterior femora black; antennæ pale ochraceous, first joint longer than the second, the apices of the first annulated with black; hemelytra very pale luteous, mottled with darker macular markings and with about four costal elongate blackish spots; wings dull greyish white, the veins darker.

Long. 7 mm.

Hab. Bâ Bay.

Subfam. *Saicinæ.*

Polytoxus jourdani.

Leptomera jourdani, Montr. Ann. Soc. Linn. Lyon, (2) xi. p. 238 (1864).
Polytoxus jourdani, Schout. Ann. Soc. Ent. Belg. li. p. 117 (1907).

Hab. Carovin, Houadou R.

Subfam. STENOPODINÆ.

Sastrapada armata.

Sastrapada armata, Montr. Ann. Soc. Linn. Lyon, (2) xi. p. 239 (1864).

Hab. Central District.

Sastrapada nigrolineata, sp. n.

Head, pronotum, and scutellum pale dull ochraceous, head with the lateral margins of the central lobe and two central, longitudinal, anteriorly and posteriorly divergent lines on basal area between eyes and the lateral margins behind eyes pale fuscous brown; ocelli reddish, eyes black; antennæ pale dull ochraceous, second joint longest; pronotum with three longitudinal linear dark fasciæ, of which one is central and the other two sublateral; scutellum with a broad, central, dark, longitudinal fascia and the basal angles of the same hue; tegmina dull ochraceous, with darker linear and maculate suffusions, the costal area distinctly paler; membrane greyish, the veins darker, the apical area also darkly suffused; body beneath—imperfectly seen in carded specimen—and the legs pale dull ochraceous; anteocular portion of head longer than posterior portion, obsoletely broadly prominent behind eyes, rostrum with the first joint about equal in length to the two apical joints together; anterior femora moderately incrassated, shortly spinose beneath.

Long. 8 mm.

Hab. Central District.

Oncocephalus velutinus.

Oncocephalus velutinus, Montr. Ann. Soc. Linn. Lyon, (2) xi. p. 230 (1864).

Hab. Mt. Mou.

Subfam. ACANTHASPIDINÆ.

UTILITARIA, gen. nov.

Head large and robust, anteocular a little longer than postocular area, eyes large, extending transversely across the lateral areas of the head, anterior margin biangulate; antennæ with the first joint about as long as head, basal joint a little stoutest, moderately curved, and shorter than the second joint; rostrum robust, first and second joints subequal in length, apical joint reaching the anterior coxæ; pronotum about twice as broad at base as at anterior margin, the anterior angles tuberculously acute, transversely constricted near middle, the anterior area convex and rugosely convoluted, the posterior area broadly but not deeply centrally sulcate, the lateral angles shortly but robustly acute ; scutellum with the apex somewhat strongly and longly apically recurved ; femora moderately long, anterior femora the more robust ; abdomen beneath centrally convexly ridged ; connexivum broad and somewhat at right angles with the abdomen.

Allied to *Gerbelius*, Dist.

Utilitaria typica, sp. n.

Head, pronotum, and scutellum dull black ; lateral margins of head near insertion of antennæ, lateral margins between eyes, two circular fasciæ on anterior pronotal lobe, two oblique fasciæ on each lateral area of the posterior lobe, the apices of the lateral angles, and the narrow posterior pronotal margin dull testaceous ; scutellum black, its apex dull testaceous ; corium stramineous, the basal and apical areas, clavus, and a few small spots on the pale area dull blackish ; membrane piceous ; head and body beneath dull blackish ; legs ochraceous, two broad annulations to femora, three annulations to anterior and intermediate tibiæ, and two annulations to posterior tibiæ black ; antennæ with the first and second joints stoutest and dull testaceous, remaining joints slender and dull ochraceous, second joint longest ; anterior pronotal angles somewhat shortly and robustly produced, posterior pronotal angles more strongly produced, disk of pronotum rugosely punctate ; other structural characters as in generic diagnosis.

Long. 11 mm.

Hab. Central District.

Fam. Capsidæ.

Callicratides antennalis, sp. n.

Ochraceous ; eyes black ; antennæ ochraceous, basal joint pale sanguineous, apex of second joint black, third and fourth joints black, with their bases narrowly ochraceous ; pronotum with a short longitudinal black line on basal area, three spots (sometimes wanting) on the anterior collar, and the extreme basal angles black, basal marginal area more or less castaneous ; margins and a central longitudinal line to scutellum, inner and outer margins of clavus, and narrow apical margins to corium black ; membrane very pale ochraceous, with the venation black ; body beneath and legs ochraceous, apices of the femora castaneous; corium more or less pale castaneous, with the lateral marginal areas and the cuneus very pale ochraceous; antennæ with the basal joint incrassated, about as long as head, second joint longest, moderately thickened, about four times as long as first; scutellum moderately long, tumid, subdepressed, and longitudinally sulcate; femora moderately incrassated.

Long. 5 mm.

Hab. Central District and Upper Houadou R.

Allied to *C. rama*, Kirby, from Ceylon and Seychelles.

FALISCUS, gen. nov.

Elongate; head moderately robust and tumid, narrowly and obscurely centrally longitudinally sulcate near base; antennæ with the first joint about as long as pronotum, second joint longest, third scarcely more than half the length of second; pronotum elongate, with a broad anterior collar, broadly transversely depressed near middle, the anterior lobe distinctly narrower than the posterior lobe, which has the basal angles nodulose; scutellum moderately tumid, about as broad at base as long; hemelytra much longer than broad, the lateral margins slightly convex, cuneus elongate; legs somewhat long and slender; rostrum about reaching the intermediate coxæ; membrane elongate, distinctly longer than broad.

Allied to *Harpedona*, Dist.

Faliscus cuneatus, sp. n.

Ochraceous, maculately marked with fuscous and red; antennæ dull ochraceous, apices of first and second joints black, bases and apices of third joint narrowly greyish white; eyes black; head with a central reddish longitudinal line, the lateral margins behind eyes narrowly black; pronotum thickly darkly punctate, the anterior lobe with its lateral areas blackish; scutellum with the basal angles and apex black; clavus darkly punctate and finely maculate, the spots on the apical area rather larger; corium darkly maculate and more or less suffused with fuscous, the dark spots on lateral areas largest, cuneus distinctly spotted with red; membrane ochraceous, somewhat largely suffused with fuscous; legs ochraceous, annulated with fuscous, the posterior tibiæ less so than the anterior and intermediate tibiæ, basal areas of the femora sparingly spotted with red; other structural characters as in generic diagnosis.

Long. 7–8 mm.

Hab. Mt. St. Arago.

Megacœlum nigroscutellatum, sp. n.

Ochraceous, moderately and testaceously punctate; antennæ ochraceous, apices of the first and second joints fuscous; eyes black; pronotum with the lateral areas generally more or less testaceous, two dark spots on anterior lobe and a series of dark spots on basal margin, the whole surface distinctly punctate; scutellum with the apex broadly black; corium finely, more darkly, and testaceously punctate, the lateral marginal areas paler and sparsely maculate; cuneus finely testaceously maculate; membrane dull greyish with darker suffusions; legs pale ochraceous, the apical areas of the femora and the tibiæ with darker annulations; first joint of antennæ slightly incrassated, a little longer than head, second joint about twice as long as first; membrane passing abdominal apex.

Var.—Scutellum with two small black spots on apical area, not apically broadly black.

Long. 5 mm.

Hab. Central Districts, Upper Houadou, Gonde.

NEMESIANUS, gen. nov.

Subelongate; head with a distinct central longitudinal carination; eyes somewhat prominent, contiguous to the anterior margin of the pronotum, but moderately projecting beyond it; antennæ with the first joint moderately incrassated, about as long as head, second joint about three times as long as first, third and fourth joints short, slender, third a little longer and stouter than fourth; rostrum indistinctly seen in carded specimens; pronotum about as long as half the width at base, the basal lateral angles subprominent, the lateral margins a little concavely sinuate; scutellum triangular, about as long as broad at base; femora somewhat strongly incrassate.

Allied to *Tancredus*, Dist.

Nemesianus nigroruber, sp. n.

Head, pronotum, and scutellum dull dark sanguineous, eyes and basal area of pronotum piceous or black; antennæ with the first joint testaceous, its apex narrowly black, second joint pale testaceous, with nearly its apical half black, third and fourth joints black, their extreme bases paler; corium piceous, cuneus testaceous, membrane piceous; femora testaceous, tibiæ and tarsi ochraceous, apices of tarsi black; structural characters as in generic diagnosis.

Long. 4 mm.

Hab. Central Districts.

Calocoris montaguei, sp. n.

Dull dark brownish ochraceous, head, anterior and lateral areas of pronotum, lateral margin of corium, and the cuneus pale ochraceous, a subbasal spot and apex of lateral margins to corium dark brownish ochraceous; legs ochraceous, posterior femora castaneous, their bases ochraceous; body beneath —imperfectly seen in carded specimens—testaceous brown; antennæ pale ochraceous, apex of second joint black, third and fourth joints more or less fuscous, basal joint stoutest, about as long as head, second joint about or a little more than twice as long as first; tibiæ setose, posterior femora somewhat strongly thickened; eyes black.

Long. 4 mm.

Hab. Central Districts, Upper Houadou R.

Calocoris nigristigmaticus, sp. n.

Stramineous; first joint of antennæ (excluding apex and base and apex of second joint), eyes, apices of scutellum and clavus, basal and apical spots to cuneus, extreme base of posterior tarsi, and apices of all the tarsi black; membrane greyish white; first joint of antennæ stoutest, about as long as head, second joint longest; femora moderately incrassated.

Long. 4 mm.

Hab. Central Districts.

Calocoris aragonus, sp. n.

Pale stramineous; eyes and lateral margins of scutellum dark testaceous, inner claval margins, a spot near claval apices, and a central linear fascia to membrane bright sanguineous; apex of second antennal joint black, first joint about as long as head, second joint three times as long as first; femora moderately incrassated.

Long. 4 mm.

Hab. Mt. St. Arago.

GUNADHYA, gen. nov.

First joint of the antennæ considerably longer than the head, second joint slightly shorter than first and a little more than subequal in length to third joint; pronotum almost twice as broad at base as long and about three times the breadth of anterior margin; scutellum broad and subglobose; corium broad, the lateral margins rounded, ampliate and recurved, cuneus large and ample; the posterior tarsi with the apical joint longest.

Allied to *Pacorus*, Dist., from British India, but with the corium shorter and broader, the lateral margins much more convex, ampliate, and recurved.

Gunadhya rubrofasciata, sp. n.

Reddish ochraceous, lateral margins of corium more sanguineous in hue, cuneus very pale stramineous in hue, its posterior margin very narrowly pale fuscous; antennæ, rostrum, and legs pale stramineous; body beneath imperfectly seen in carded type; pronotum thickly coarsely punctate; scutellum globose, impunctate; lateral margins of corium convex, ampliate, and recurved, with sanguineous reticulations.

Long. 4 mm.

Hab. Upper Houadou R.

Family **Pelogonidæ.**

Subfam. *PELOGONINÆ.*

Pelogonus marginatus.

Pelogonus marginatus, Latr. (*Acanthia*) Hist. Ins. xii. p. 242 (1804).

Hab. Gondé; Houadou R.

Fam. **Notonectidæ.**

Subfam. *NOTONECTINÆ.*

Enithares bergrothi.

Enithares bergrothi, Montand. Rev. d'Ent. xi. p. 75 (1892).

Hab. Near Dumbea.

XX.—*A Whale-barnacle of the Genus* Xenobalanus *from Antarctic Seas.* By W. T. CALMAN, D.Sc.

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AMONG the barnacles that infest the skin of whales *Xenobalanus globicipitis*, Steenstrup, is remarkable in that, although belonging to the sessile or operculate group of the Cirripedia, it closely resembles in general appearance the species of the pedunculate genus *Conchoderma*. It has hitherto been known only from the North Atlantic, and it seems desirable, therefore, to record the fact that the Natural History Museum has recently received specimens of what appears to be the same species from the Antarctic region.

Xenobalanus globicipitis, Steenstrup.

Xenobalanus globicipitis, Steenstrup, Overs. K. danske Vidensk. Selsk. Forh. 1852, no. 2, p. 158; id. Vidensk. Medd. Nat. Foren. Kjöbenhavn, 1851 (1852), p. 62, pl. iii. figs. 11–15; Darwin, Balanidæ, 1854, p. 440, pl. xvii. figs. 4 *a*–4 *c*; (with var. *pallidus*) Pilsbry, Bull. U.S. Nat. Mus. xciii. 1916, p. 283, pl. lxv. figs. 2, 2 *a*, 2 *b*.

Locality.—South Shetland Islands, 5th March, 1918, from the tail of a finner-whale. Collected by Mr. A. G. Bennett.

Distribution.—Faroe Islands, between Madeira and England, Madeira, Azores (*Steenstrup, Darwin*); New England (*Pilsbry*): on pectoral, dorsal, and tail-fins of *Globicephala*. Shetland, on tail of *Balænoptera physalus*, R. C. Haldane Coll. (Mus. Brit. and Mus. Zool. Cambridge).

Remarks.—The specimens from the South Shetlands are in very bad condition, few of them showing more than the basal star-shaped shell and the empty cuticle of the body-sheath. In one specimen two or three cirri are preserved. Further, in consequence of having been kept for two years in formalin, the shell is in all cases exceedingly friable, so that it falls to pieces almost at a touch. In all characters that can be ascertained, except that of size, however, the specimens agree with the descriptions of *X. globicipitis* and with the specimens in the Museum collection. Darwin states that the largest specimen he had seen was nearly 2 inches long, and that its shell measured "from extreme point to point nearly a quarter of an inch in diameter." Among the specimens from the South Shetlands the longest measures 75 mm., and it is imperfect at the distal end, so that its length may have been considerably greater. The greatest diameter of its shell, measured obliquely from tip to tip of the "rays," is 16 mm.

In the published records of the species the only hosts mentioned by name are species of *Globicephala*; but, as noted above, there are in the British Museum and in the Museum of Zoology, Cambridge, specimens taken off Shetland by Mr. R. C. Haldane from the tail of a finner-whale (*Balænoptera physalus*). Similarly, the specimens now recorded from the South Shetlands were attached near the margin of the tail-flukes of an Antarctic finner, which many authorities regard as specifically identical with *B. physalus*.

XXI.—*Remains of the Great Auk and Ptarmigan in the Channel Islands.* By C. W. ANDREWS, D.Sc., F.R.S.

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A SMALL collection of fragmentary bones from a cave in St. Brelade's Bay, Jersey, was recently sent to me by Professor R. R. Marett, F.S.A., for examination. The specimens were few and very imperfect, but they included two interesting additions to the fauna previously recorded from the locality. The most important is the upper end of a right humerus of the great auk (*Alca impennis*, Linn.): this fragment is quite characteristic and unmistakable. The most southerly locality from which remains of the species had previously been recorded is, I believe, Co. Waterford, where they were found in kitchen-middens, and described by R. G. Ussher in the 'Irish Naturalist,' vol. viii., Jan. 1899, p. 1. Prof. Marett informs me that in a recently opened recess of the Cavern of Gargas (Hautes Pyrénées) there was found engraved on the wall the figure of a bird which was supposed to represent the great auk. If this determination turns out to be correct, it would show that the range of this bird was at one time far greater than has hitherto been supposed.

The other interesting specimen from St. Brelade's Bay is a left tarso-metatarsus of the ptarmigan (*Lagopus mutus*, Montin, sp.), also new to this locality. Previous collections include remains of the woolly rhinoceros, reindeer, cave-bear, and other characteristic Pleistocene animals.

XXII.—*On some Freshwater Fishes from Lower Congo.*

By EINAR LÖNNBERG and HIALMAR RENDAHL.

THE R. Nat. Hist. Museum in Stockholm has recently received from the Swedish missionary, Rev. K. E. Laman, D.D., a small collection of freshwater fishes collected in Lower Congo, partly at Mukimbungu in Belgian Congo and partly at Kingoyi at the watershed between French and Belgian Congo. This collection does not contain more than twenty different species, but it proved at a closer examination to be quite valuable, because not less than six of these species appear to be new. A rather unexpected discovery was also the find of a member of the East-African genus *Discognathus* in Lower Congo.

Mormyrops deliciosus, Leach.

Native name "Mbono."
Locality. Congo River, Mukimbungu.
One specimen, about 60 cm. in total length.

Labeo longipinnis, Blgr.

Native name "Lombuka."
Locality. Congo River, Mukimbungu.
One specimen, measuring about 22 cm. in total length.

This specimen agrees on the whole quite well with Boulenger's description. The pectoral is, however, not quite as long as the head, and it does not reach the ventral. The length of the head is not contained fully four times in the length of head and body.

Labeo nasus, Blgr.

Native name "Mbemba."
Locality. Kwilu River, Mukimbungu.
One specimen, 46·5 cm. in total length.

This specimen differs from Boulenger's description in the following points:—The head is large, so that its length is not contained more than 3¾ times in total length, and the depth of the body is only contained 3½ times in the same. It is possible that these differences are due to the much larger size of our specimen than those examined by Boulenger (19 cm.).

With full certainty the relative smallness of the eye can be counted as due to this fact; its length is contained ten times in the length of head and four times in the interorbital width.

Polypterus congicus, Blgr.

Native name "Nkungi ańgandu."
Locality. Congo River, Mukimbungu.
One specimen, 74 cm. in total length (caudal incl.).

Microthrissa eupleura, sp. n.

Locality. Lower Congo.
Four specimens, the longest about 5 cm.

Depth of body about 4 times in total length (s. c.), head a little more than 4 times in the same. Snout a little shorter than eye. Eye fully 3 times in head. Lower jaw very slightly projecting. The number of scales in lateral line probably only about 30. Ventral scutes 11 in front of ventrals, 10 between ventrals and anal; these scutes extend high up on the sides so as to cover more than $\frac{2}{5}$ of the space between the ventral keel and the lateral line. Pectoral about $\frac{3}{4}$ length of head, not reaching ventral. Origin of dorsal about midway between snout and base of caudal. Dorsal rays 11 in number. Distance from snout to vent about twice as long as distance between vent and base of caudal. Ventrals in advance of origin of dorsal. Caudal peduncle about as long as deep.

Unfortunately the glass in which these specimens were preserved had been broken, so that the specimens arrived in a completely dry state. In consequence of this we had from the beginning not intended to do anything with them. As an examination, however, revealed that the number of ventral scutes in all the specimens received constantly differed from that of the two species of *Microthrissa* hitherto described, and that our specimens thus most easily could be recognized by that characteristic, we were compelled to take up the matter for further consideration. We took also the liberty of sending one of the specimens to Dr. Boulenger, who most kindly confirmed our view that it represented an undescribed species of *Microthrissa*. We are convinced that the above diagnosis will be sufficient for distinguishing the present new species, but the condition of the specimens accounts for the shortcomings of the description.

Barbus lamani, sp. n.

Native name "Nlulu."

Locality. Mukimbungu.

One specimen, 10·2 cm. in total length.

Depth of body 3⅖ times in total length; length of head 3¼ times. Snout blunt, a little longer than eye. Upper margin of eye about touching the upper profile-line of the forehead. Eye 4 times in length of head; interorbital width 3½ times in length of head. Mouth almost terminal. Two barbels on each side, about equal in length, and about 1⅓ times diameter of eye. Dorsal III 7, a little nearer occiput than caudal, border slightly concave; last simple ray flexible, not enlarged, not serrated, not quite 1½ times in the length of head. Anal III 5, not reaching caudal. Pectoral not quite 1½ times in the length of head, not reaching ventral; base of latter below anterior base of dorsal. Caudal peduncle fully 1⅓ times as long as deep. Scales with few radiating canals; 26 $\frac{4\frac{1}{2}}{4\frac{1}{2}}$, 3 between lateral line and ventral, 11 round caudal peduncle. There appears to have been a longitudinal blackish shading along the lateral line, as well on the anterior part of the body as on the caudal peduncle. A small roundish black spot at the base of the caudal.

The general colour in alcohol is rather olive, most of the scales with a dark spot at the base.

This *Barbus* belongs evidently to the same group as *B. camptacanthus*, Bleek., with which it agrees in most respects. It differs, however, by the shape of its snout, the situation of the eye, the much smaller interorbital width, etc.

Barbus camptacanthus, Bleek.

Native name "Nionzi."

Locality. Kingoyi, Lower Congo.

Five specimens.

Discognathus occidentalis, sp. n.

Native name "Mululu."

Locality. At the watershed between French and Belgian Congo, Kingoyi.

Three specimens, length of the largest one 57 mm.

Body feebly compressed, its depth 5½ times in total length. Head moderately depressed, a little broader than deep, a little more than 1½ times as long as broad, its length about 4 times in total length (s. c.). Snout rounded, strongly projecting beyond mouth. Interorbital region flat; its width is contained about 2½ times in length of head. Eye superolateral, in middle of length of head, its diameter about 5 times in length of head, a little more than twice in interorbital width. Width of mouth (with lips) a little less than ½ length of head. Upper lip well developed (but much narrower than in *D. blanfordi*), feebly crenulated. Lower lip surrounding a mental disc which is about as broad as long. Two barbels on each side measuring about ⅔ diameter of eye. Dorsal III 7, equally distant from eye and from caudal, longest ray shorter than head. Anal II 4. Pectoral as long as head, not reaching ventral, which originates below the middle of the dorsal. Caudal emarginated. Lateral line 38, 5½ scales between beginning of dorsal and lateral line. Caudal peduncle about 1½ times as long as deep, 15 scales round the same.

When first examining these specimens we were struck by the great resemblance to *D. blanfordi*, Blgr. Dr. Boulenger, to whom we took the liberty of sending a specimen for comparison, agreed with us in finding it similar to the species mentioned, but pointed out that the upper lip of our form is more feebly developed than in *D. blanfordi*, in which respect it resembles *D. johnstonii*, Blgr. The latter has, however, the eye situated in the second half of the eye, etc.

This species differs very plainly from *D. ornatus*, Nichols and Griscom*, recently described from Stanleyville, by being less compressed and by the supero-lateral situation of the eye, which also is comparatively smaller, and by the not banded caudal.

Clarias lazera, Cuv. Val.

Native name "Mpudi."

Locality. From a lake at Mukimbungu in Lower Congo.

Two specimens.

Clarias ngola, sp. n.

Native name "Ngola."

Locality. Kingoyi, Lower Congo.

One specimen, 18 cm. in total length.

Depth of body 8 times in total length, length of head about 4½ times. Head 1¼ times as long as broad, smooth; occipital process triangular; frontal fontanelle knife-shaped, its length contained about 3⅓ times in length of head; occipital fontanelle about half the size of the frontal one, extending well into the occipital process. Eye very small, about 5 times in length of snout and about 6½ times in interorbital width, which nearly equals ½ length of head. Band of præmaxillary teeth about 6 times as long as broad. Vomerine teeth granular, forming a curved band about as broad as the præmaxillary band. Nasal barbel about ¾ length of head. Maxillary barbel 1¼ the length of head. Dorsal about 75, its distance from occipital process nearly ½ length of head, its distance from caudal not quite as large as diameter of eye. Anal about 60, equally distant from caudal. Pectoral somewhat longer than half the length of the head, the spine feebly serrated on outer side. Ventral 1⅗ as distant from base of caudal as from end of snout. Colour in spirit uniformly brown.

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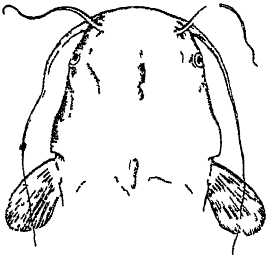
* Bull. Am. Mus. Nat. Hist. vol. xxxvii. 1917, p. 696.

Fig 1.



Head of *Clarias ngola*, nat. size.

Channulabes apus, Günth.

Native name "Ntondia."
Locality. Mukimbungu.
Three specimens.

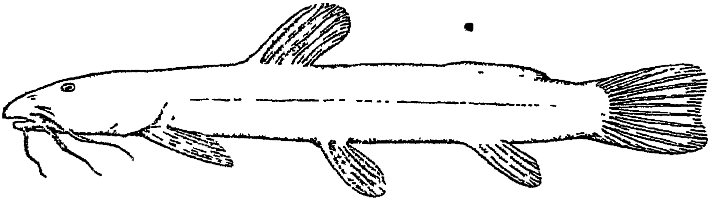
Amphilius lamani, sp. n.

Native name "Kikweta."
Locality. Kingoyi, Lower Congo.
Two specimens, total length of the type 96 mm.

Depth of body 9 times in total length, length of head 3⅗ times. Head much depressed, a little longer than broad;

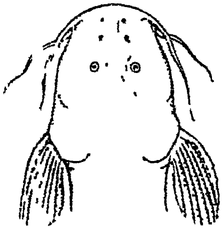
snout broadly rounded, its length being contained about $2\frac{1}{2}$ in the length of the head. Eye very small, about 17 times in length of head, about 4 times in interorbital width. Posterior nostril a little nearer to anterior border of eye than end of snout. Maxillary barbel not quite as long as head, reaching somewhat beyond the root of pectoral. Outer mandibular barbel $\frac{3}{5}$ length of head; inner mandibular barbel nearly $\frac{1}{2}$. Gill-rakers 5 or 6 on lower part of anterior arch, moderately long. Dorsal I 6, nearer end of snout than root of caudal, situated just in advance of the root of ventrals. Adipose dorsal low, not quite twice as long as rayed dorsal. Anal II 5.

Fig. 2.



Amphilius lamani, nat. size.

Fig. 3.



Head of *Amphilius lamani*, enlarged.

Pectoral $\frac{2}{3}$ length of head. Ventral about as long as pectoral, situated entirely but not much behind dorsal. Caudal truncate. Caudal peduncle, if counted from last ray of anal, $\frac{4}{5}$ as deep as long. Colour in spirit uniformly brown, the dark pigment extending over the greater part of the caudal as well.

In its general shape, with its broad head and deep caudal peduncle, this new species to a certain degree resembles the East-African members of the genus, but its dorsal is not so far advanced as in them. With the recently described *Amphilius notatus*, Nichols and Griscom *, from Faradje our species has no likeness whatever, as the shape of the head and the caudal peduncle, the size of the eye, and the adipose fin are completely different.

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* *Loc. cit.* p. 715.

Synodontis acanthomias, Blgr.

Native name "Nkoko."
Locality. Mukimbungu, in a lake.
One specimen.

Synodontis caudalis, Blgr.

Native name "Ntanta."
Locality. Mukimbungu.
Two specimens.

The present specimens differ from Boulenger's description in having the outer mandibular barbel of the same length as the head and the occipital nuchal shield rugose. With regard to the colour, one of the specimens has the fins beautifully marked with roundish dark spots serially arranged. The body is more or less marbled. In the other specimen the fins do not display any similar pattern, except very feebly on the dorsal.

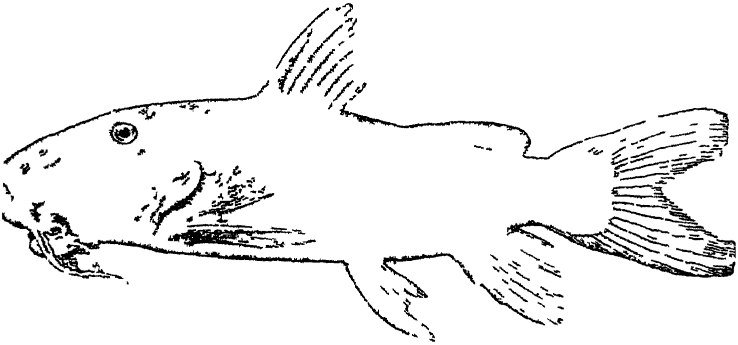
Synodontis ovidius, sp. n.

Native name "Nsinzi."
Locality. Mukimbungu.
One specimen, 31 cm. in total length (caudal included).

A *Synodontis* related in some degree to *S. longirostris*, Blgr., and *S. labeo*, Gthr., but quite different from both.

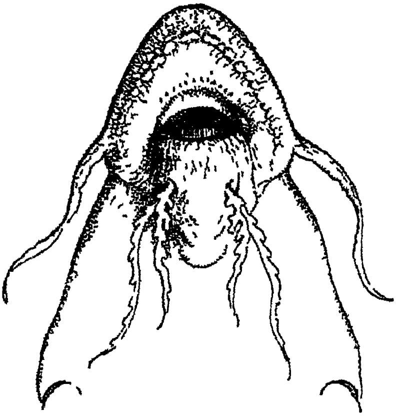
Depth of body 4½ times in total length, head 2¾. Head about 1½ times as long as broad, rugose above from between the eyes and backwards. Snout 2¼ as long as postocular part of head, terminating in a globular swelling, which is continued nearly to the base of the maxillary barbel. Eye supero-lateral, 9 times in length of head, 2½ times in interorbital width. Lips very strongly developed, beset with numerous papillæ. Along the upper lip a continuous row of much enlarged papillæ is especially striking. Chin swollen, forming a thick pad. Præmaxillary teeth arranged in two rows, about 13 in the interior and about 7 in the exterior. These rows are rather close together, but there is an interspace between the single teeth. The movable mandibular teeth appear at the first look to be 16 in number, rather long, about ½ the diameter of the eye, but a closer examination reveals some more between and behind the others, so that the total number amounts to about 25. Maxillary barbel margined and somewhat crenulated, $\frac{1}{2}$ the length of the head. Mandibular barbels branched, the outer $\frac{2}{5}$ length of head, the inner $\frac{1}{3}$. Gill-opening not extending beyond the root of the pectoral. Occipital nuchal shield rugose and granular, longer than broad, with rather pointed posterior processes. Humeral process coarsely granular, about twice as long as broad, bluntly pointed, but with convex upper and lower

Fig. 4.



Synodontis ovidius, a little more than $\frac{1}{3}$ nat. size.

Fig. 5.



Lower side of head of *Synodontis ovidius*, nat. size.

margins, not extending quite as far back as occipital nuchal process. Dorsal I 6. Dorsal spine a little more than ½ the length of the head, striated in front and on the sides, minutely denticulated behind. Base of adipose dorsal not quite twice as long as its distance from rayed dorsal, the base of which is 1⅓ the distance between both dorsals. Anal III 8. Pectoral spine longer than dorsal spine, serrated behind. Ventrals nearly reaching anal. Caudal deeply forked (both lobes are truncated, and appear to have been bitten off during life and healed). Caudal peduncle (from adipose fin) a little longer than deep. Colour in spirit brownish olive, with numerous roundish dark spots on head and body as well as on fins. The spots on the sides of the body are about 10 mm. in diameter, those on the head and the fins only about halt that size or less.

Phractura bovei, Perugia.

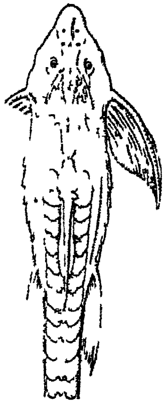
Native name "Ntiki-ntiki."
Locality. Lower Congo.
Two specimens.

Belonoglanis nudipectus, sp. n.

Native name "Ntiki-ntiki."
Locality. Lower Congo.
One specimen, 110 mm. in total length (s. c).

Depth of body about 13½ times in total length, length of head 8⅕ times. Head much depressed, 1⅕ times as long as broad, rugose above ; the λ-shaped ridge on the snout not so much pronounced as in *B. tenuis*, and its branches divide further backwards than in the species mentioned (*cfr.* fig.), about on the level with the posterior nostrils. Occipital process trilobate, but the lateral branches more slender and more diverging from the mesial line than in *B. tenuis* (*cfr.* fig.). Snout pointed, a little less than ⅖ length of head, strongly projecting beyond mouth. Eye 7½ times in length of head, 2½ times in interorbital width. No rounded rugose process on coracoid below base of pectoral. First dorsal I 7, first ray longer than head. Anal 8. Pectoral a little longer than head, not reaching ventral; the latter widely separated from anal. Caudal about half the length of head, rather deeply cleft. Caudal peduncle very thin and depressed, ⅖ total length. The azygous plate in front of the dorsal fin is broader behind than in front (*cfr.* fig.), unlike the condition in *B. tenuis*, Blgr., in which it appears to be broader in front than behind. From the origin of the dorsal 22 pairs of dorsal scutes are well defined and may easily be counted, but from the middle of the caudal peduncle and backwards the sutures of the scutes are completely coalesced: 6 large scutes on each side of body between pectoral and ventral; behind the ventrals 15 pairs of well-defined scutes on the lower side of the tail; the following are completely coalesced as well with each other as with the dorsal ones, thus completely encasing the tail. Pale brownish, no blackish marks to be seen.

Fig. 6.



Anterior part of *Belonoglanis nudipectus*, nat. size.

Malapterurus electricus, Gmel.

Native name "Cuda."
Locality. Mukimbungu, Congo River.
One specimen.

Pelmatochromis lateralis, Blgr.

Native name "Kiala."
Locality. Mukimbungu, Congo River.
One specimen.

Anabas . anus, Gthr.

Native name "Kimpete."
Locality. Kingoyi.
Three specimens.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 32. AUGUST 1920.

XXIII.—*Notes on various African and Asiatic Species of* Hapalochrus, *Er., with an Account of their accessory ♂-characters* [*Coleoptera*]. By G. C. Champion, F.Z.S.

[Plate VIII.*]

This paper contains notes on all the African and Asiatic species of the Melyrid-genus *Hapalochrus* represented in the British Museum in London and in the Congo Museum at Tervueren, supplemented by a few others lent me by Dr. Sjöstedt (including types of Bourgeois), Dr. Gestro, Dr. Péringuey, and Prof. Poulton. The material from the Belgian Congo, kindly communicated by M. Schouteden, consists of upwards of 3000 examples (including various types of Pic and specimens named by him), and that belonging to the British Museum (including types of Murray and Gorham) is from various parts of Africa—mainly from the vicinity of the Great Lakes and Uganda, collected by Dr. Neave, and a very interesting paired series of numerous species obtained by the late H. C. Dollman in N. Rhodesia,—India, the Malayan Region, and Arabia.

The identification of some of the named *Hapalochri* from description alone has proved to be impossible in many cases when the ♀ only was known to the author, or when the

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* [The Plate will be published with the concluding part of the article.]

♂-characters were so briefly noted that they would apply equally well to several distinct species *. In consequence of this, several forms are here treated as new which may have to be sunk as synonyms when types can be compared. The ♀♀, moreover, are frequently indistinguishable *inter se* (as in certain *Malachius*, *Henicopus*, &c.) in the absence of ♂♂ from the same localities. The accessory ♂-characters in the antennæ, legs, &c., however, are so well marked that there is not very much difficulty in distinguishing the species when examples of that sex are available for examination. The following external marks of distinction have been observed in the males: (1) antennæ—flabellate, pectinate, serrate, or subfiliform; (2) head—usually as in ♀, rarely excavate (*H. clavicornis*) or with the epistoma tumid and flavescent (*H. abyssinicus*, &c.); (3) anterior trochanters (described as coxæ by Pic)—toothed, or simple as in ♀; (4) anterior femora—usually simple as in ♀, rarely toothed at the middle or base; (5) anterior tibiæ—lobed, dilated, or angulate at about the middle, or simply sinuate; (6) anterior tarsal joint 2—usually produced above over the base or more of joint 3 (sometimes broadly so and nigro-pectinate at tip, sometimes narrowly and claw-like), rarely simple as in ♀ †; (7) intermediate trochanters—usually simple, rarely (two Eastern or Indian forms) scaphiform or lobed; (8) intermediate femora—usually simple, sometimes angulate about the middle, or with a basal or median excavation or fovea beneath; (9) intermediate tibiæ—in some species greatly inflated, and deeply excavate and lamellate, toothed, or penicillate on their inner aspect, in others broadly, subtriangularly dilated, and more or less distinctly appendiculate or lobed near the inner apical angle, in others again moderately thickened, sinuate, or simple. In addition to above-mentioned characters, the head, antennæ, prothorax, or legs are also sometimes differently coloured in the two sexes, and in a few species (*H. amplipennis*, &c.) the wings are reduced in size or rudimentary in the females, these insects having inflated elytra. The females of certain African forms

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* The *Hapalochri* named by Pic in his "Diagnoses préliminaires" ('L'Echange,' xxvii. p. 123, 1911), and in his "Malacodermes Africains" (Mélanges exot.-entom. xxxi. pp. 10, 11, Oct 1919), issued "pour prendre date," have no claim for recognition, some of the descriptions being totally inadequate.

† Bourgeois included various African forms under this section (*Paratinus*), two only of them, *H. amplipennis* and *H. modestus*, really belonging to it, one at least of the others having the second tarsal joint produced above.

[HETEROLAIUS, gen. nov.] referred to *Laius*, Guér.—*L. inflaticornis*, Fairm. [type], *L. bourgeoisi*, Gestro, and *L. latipennis*, *violaceipennis*, and *spinicoxis*, Pic—are extremely like the same sex of various species of the present genus, but they are separable therefrom by the subequally elongated, narrow, second and third joints of the antennæ, these two joints being greatly dilated and subconnate, and the anterior tarsi simple, in the males. *Collops velutinus*, Gerst., from Zanzibar, type ♀ (1873), referred to *Hapalochrus* by Fairmaire in 1887, must be a true *Laius*. In the descriptions here given, the short node at the base of the second antennal joint is not counted as a true joint, the antennæ being treated as 10-jointed, as in *Laius* and *Collops*.

Amongst the African *Hapalochri* we find groups of species represented by *H. nobilis*, *sjöstedti*, *testaceicornis*, *appendicifer*, *amplipennis*, &c., respectively, with a common, abundant, primitive type of ♀, and a series of ♂ ♂ confined to particular localities with diverse, constant, differential characters, which, in the present state of our knowledge of these insects, must be regarded as of specific value.

Key to the African Species *.

♂ ♂.

1 (22). Anterior tarsal joint 2 prolonged over 3, the apical portion sometimes broad and nigropectinate at tip, sometimes narrowed and claw-like.

2 (3). Anterior tibiæ produced at the inner apical angle into a very long, curved, simple or asymmetrically bifurcate spine; antennæ flabellate: intermediate tibiæ greatly swollen; prothorax metallic (maculate in ♀ of No. 1); elytra maculate or unicolorous. [Subgen. HAPALOCHROPS, Bourg.] ...... Species 1, 2.

3 (2). Anterior tibiæ not produced at the inner apical angle. [HAPALOCHRUS, Er., s. str.]

4 (7). Elytra maculate; intermediate tibiæ greatly swollen, penicillate in No. 3.

5 (6). Antennæ flabellate or pectinate (intermediate femora in No. 3 with a large, oval, metallic area beneath at base) .... Species 3, 4.

6 (5). Antennæ serrate; intermediate femora without fovea .... Species 5.

7 (4). Elytra not maculate.

8 (9). Anterior femora toothed at middle (Nos. 6–10) or base (No. 11); intermediate tibiæ slender; antennæ pectinate..................... Species 6–11.

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* Males of *H. nobilis*, *cinerascens*, *caudatus*, *dollmani*, and *scabrosus* unknown; *H. dollmani* (No. 58) omitted from Table.

9 (8). Anterior femora unarmed; intermediate tibiæ slightly incrassate; antennæ pectinate .... Species 12.

10 (13). Intermediate tibiæ greatly thickened, convex externally, deeply excavate or sulcate within (and sometimes sinuously sulcate above), the upper or lower edge of the excavation lamellate, dentate, or penicillate: species large, robust.

11 (12). Epistoma flavescent, tumid (Nos. 13–15) or flattened (No. 16) .... Species 13–16.

12 (11). Epistoma metallic (as in ♀) * .... Species 17–21.

13 (10). Intermediate tibiæ more or less incrassate or widened, not lamellate or toothed, often lobed or appendiculate near inner apical angle.

14 (15). Apical joint of antennæ flattened and dilated; head excavate; intermediate tibiæ broad, angulate externally, appendiculate........ Species 22.

15 (14). Apical joint of antennæ undilated.

16 (17). Anterior femora with a small tooth at base; anterior trochanters toothed (except in Nos. 26–28); intermediate femora excavate at base beneath (except in Nos. 26, 27); intermediate tibiæ broad and appendiculate (except in Nos. 26, 28).................. Species 23–28.

17 (16). Anterior femora without basal tooth.

18 (21). Intermediate tibiæ broad, more or less distinctly appendiculate.

19 (20). Intermediate femora angulate: anterior trochanters toothed (except in No. 29) ...... Species 29–32.

20 (19). Intermediate femora not angulate (anterior femora penicillate at base in No. 35; anterior trochanters toothed in Nos. 33, 38; intermediate femora foveate at base beneath in No. 44; wings abbreviated in ♀ ♀ Nos. 33, 34) .... Species 33–44.

21 (18). Intermediate tibiæ narrower, not appendiculate; intermediate femora not angulate (except in Nos. 45, 52, 55); anterior trochanters toothed in Nos. 45, 49, 52, 54 .... Species 45–57.

22 (1). Anterior tarsi simple; intermediate tibiæ broad, appendiculate. [Subgen. PARATINUS, Ab.]

23 (24). Anterior trochanters toothed .... Species 59–62.

24 (23). Anterior trochanters unarmed (wings abbreviated in ♀ ♀ Nos. 65–67) .... Species 63–67.

1. *Hapalochrus sumtuosus.*

Apalochrus sumtuosus, Boh. Ins. Caffraria, i. p. 458 (♂ ♀) (1851).

Hapalochrus sumtuosus, Péring. Trans. S. Afr. Phil. Soc. vi. 2, p. 46 (1892).

Hapalochrus (*Hapalochrops*) *sumptuosus*, Bourg. in Sjöstedt's Kilimandjaro-Meru Exped. i. Abt. 7, No. 10, p. 130, t. 3. fig. 13 (♂) (1908).

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* *H. opulentus*, Péring., belongs to this section.

Hapalochrous sumptuosus (♂), and vars. (♀) *nyassensis* and *signaticollis*, Pic, Mélanges exot.-entom. iv. pp. 2, 3 (Sept. 1912).
♀. *Apalochrus sumptuosus*, var. *reductus*, Pic, op. cit. xxxi. p. 10 (Oct. 1919).
Var.? *Apalochrus erichsonii*, Roth in Wiegmann's Archiv, 1851, 1, p. 120 (♂ ♀).
Hapalochrus erichsonii, Gestro, Ann. Mus. Genova, xxxv. p. 353 (♀) (1895).

♂. Antennæ long, flabellate from joint 4 onward; anterior femora stout; anterior tibiæ rapidly widening outward, slightly sinuate within, the inner apical angle produced into a long, curved, pointed spine, which extends outward beneath the first tarsal joint: anterior tarsal joint 1 elongate, stout, compressed, ciliate externally, 2 much shorter, broadly oval, convex above, concave beneath, extending over joint 3 to its apex, nigro-pectinate at the tip (Pl. VIII. fig. 7); intermediate femora stout, feebly curved; intermediate tibiæ (Pl. VIII. fig 7 *b*) slender at the base, enormously dilated, curved, and convex towards the apex above, deeply excavate and pilose towards the apex within and beneath.

♂. *Var.* 1. Anterior tibiæ (Pl. VIII. fig. 7) shorter and more swollen at the apex, the inner apical angle produced into a long, curved spine (as in the type of *H. sumtuosus*), the outer apical angle also produced into a short, curved, downwardly-directed tooth.

♂. *Var.* 2. Anterior tibiæ (Pl. VIII. fig. 7 *a*) with the inner apical angle produced into a rather broad, compressed, curved lobe, which extends outward beneath the first tarsal joint and bears a long inwardly-curved hook towards the apex externally (the lobe thus appearing asymmetrically bifurcate at the tip).

Var. ♀. Elytra entirely fulvous.

Hab. E. Africa, Caffraria (*types of Boheman*: ♂ ♀), Transvaal and Ovampoland (*sec. Péringuey*), Mashonaland (*H. B. Dobble*), Waterburg (*W. L. Distant*), Salisbury (*G. A. K. Marshall*: ♂ vars. 1, 2, ♀), Mwengwa in N.W. Rhodesia (*H. C. Dollman*), Chiromo in Nyasaland (*R. C. Wood*), Nyasaland S.W. of Lake Chilwa (*S. A. Neave*), Mkomasi, Tanganyika Territory (*A. Loveridge, in Mus. Oxon.*: ♂), Lake Ngami (*Mus. Brit.*, *Mus. Oxon.*), Kilimandjaro (*Dr. Sjöstedt*), Arussi Galla in Abyssinia (*Bottego, in Mus. Genoa*: ♀), Eritrea (*sec. Bourgeois*).

A common insect in E. Africa, but not extending into the Congo Region. The anterior tibiæ of the ♂ exhibit three variations in the development of the very long curved apical spur, this being spiniform in the males described by

Boheman and Bourgeois, and in one of those from Salisbury, and another from Mkomasi before me, and broader and asymmetrically bifurcate in the 28 other males seen from Rhodesia, Lake Ngami, and Nyasaland. Some of the Salisbury examples (♂ ♀) have the metallic patches of the elytra longitudinally confluent, and in two females from the same locality the markings are altogether wanting. *H. erichsoni*, Roth, from Abyssinia, a ♀ of which determined by Dr. Gestro is before me, is probably synonymous with *H. sumtuosus*.

2. *Hapalochrus deformipes.*

Hapalochrus (*Hapalochrops*) *deformipes*, Bourg. in Sjöstedt's Kilimandjaro-Meru Exped. i. Abt. 7, No. 10, p. 132, t. 3. fig. 14 (♂) (1910).

♂. Characters as in typical *H. sumtuosus*, Boh.: the inner apical angle of the anterior tibiæ produced into a long, curved, outwardly-directed spine as in the males described by Boheman and Bourgeois.

Hab. E. Africa, Banks of the River Ngare na nyuki, Meru (*Dr. Sjöstedt*); Eritrea (*coll. Bourgeois*).

This insect, the unique type (♂) of which has been kindly forwarded for examination by Dr. Sjöstedt, is probably, as suggested by Bourgeois, a form of *H. sumtuosus* with the upper surface uniformly metallic. The ♂-characters are precisely similar. The ♀ with a metallic prothorax, from Amara, Eritrea, provisionally referred by the same author to *H. sumtuosus* (p. 132, nota), affords a connecting-link between the two forms, if it really belongs to this group?

3. *Hapalochrus longior.*

♂. *Hapalochrous longior*, Pic, Le Naturaliste, xxv. p. 81 (1903); Mélanges exot.-entom. iv. p. 2 (Sept. 1912).

♂. Epistoma testaceous, the oblique lateral portions almost smooth and somewhat tumid; antennæ long, feebly serrate; anterior tibiæ excavate towards the apex within, the apical portion somewhat thickened; anterior tarsal joints 1 and 2 thickened, subequal in length, 2 with a black comb at the tip; intermediate femora (Pl. VIII. fig. 9 *a*) with a large, oval, depressed, metallic area at the base beneath; intermediate tibiæ (Pl. VIII. figs. 9, 9 *a*) enormously thickened, rounded and convex externally, deeply excavate beneath, and abruptly emarginate before the apex within, the emargination preceded by a long, matted, dentiform tuft of curled fulvous hairs and followed by a smaller tuft of similar hairs, these tufts arising from the cavernous lower surface.

Var. The testaceous lateral markings on the elytra extending inwards and forming an angulate median fascia, the subapical green fascia sometimes reduced to an irregular oblique green patch on the disc of each elytron.—?=*H. jansoni*, Pic, ♀ (1912).

Hab. W. Africa, Benguela, Congo, Gaboon (*Pic*), Agoué, Benin (*Abbé Menager*), Angola, Whydah (*Mus. Brit.*), Lagos in S. Nigeria (*J. A. de Gaye*), Cotonou in Dahomey, 70 miles W. of Lagos (*W. A. Lambora*: v., vi. 1914: ♂ ♀: *Mus. Brit.*, *Mus. Oxon.*), Tamsoo, Gold Coast (*Mus. Brit.*: ♂); Lambarene, French Congo (*L. Fea*: xi., xii. 1902: ♂ ♀: *Mus. Genoa*); Boma, Sassa, Tolo, Eala, Kundi, Lukolela, Kwamouth, Bas-Kasaï, Coquilhatville, &c., Belgian Congo (*Mus. Congo Belge*: ♂ ♀, and vars.).

Numerous examples of this species are before me, including sixteen males, mostly belonging to the Congo, Genoa, or Oxford Museums: the variety (?=*H. jansoni*, Pic, type ♀) is represented by a ♀ from Dahomey and a ♂ from the Congo. The only ♂-character noted by Pic is the "simple antennæ." The testaceous anterior portion of the head is of course peculiar to that sex, the ♀ having the head entirely metallic.

4. *Hapalochrus nobilis.*

♀. *Apalochrus nobilis*, Er. Archiv fur Naturg. 1843, 1, p. 226.
Hapalochrous nobilis, Pic, Mélanges exot.-entom. iv. (Sept. 1912).

Hab. W. Africa, Angola (*type of Erichson*), Onitsha in S. Nigeria (*J. A. de Gaye*: vii. 1910: ♀).

A ♀ from Nigeria in the British Museum agrees with the description of *A. nobilis*, except in having the antennæ, femora, and tarsi darker, a character of no importance in the present genus. This insect is extremely like *H. longior*, Pic, and has the elytra marked as in one of the forms of that species—metallic bluish-green, with a triangular patch at the middle of the sides and another at the apex testaceous; from which it is separable by the broader and more robust build, and the rugosely punctured sides of the prothorax. The ♂-characters may prove to be dissimilar from those of the allied *H. longior*, an insect also occurring in Angola.

5. *Hapalochrus festivus.*

♀. *Apalochrus festivus*, Er. Entomographien, p. 52 (1840).
Hapalochrous festivus, Pic, Mélanges exot.-entom. iv. p. 3 (Sept. 1912).

♂. Antennæ simply serrate, long; anterior tibiæ excavate towards the apex within, the apical portion thickened; anterior tarsal joints 1 and 2 stout, equal in length, 2 with a black comb at the apex; intermediate femora simple; intermediate tibiæ (Pl. VIII. fig. 3) strongly incrassate, convex above, concave beneath, broadly, arcuately dilated towards the apex within, and then very deeply excavate between this and the tip; antennæ and legs testaceous, the apices of the former, and the tarsi in part, slightly infuscate, the posterior femora black or metallic at the apex.

Hab. W. AFRICA, Senegal (*Mus. Brit.*: ♂), Gaboon (*Mus. Oxon.*: ♂).

The ♂ of this species (if correctly named in the British Museum) is apparently undescribed, the ♀ type from Senegal having darker legs, as is often the case in the present genus. An elongate insect, with the head and prothorax metallic green, and the elytra testaceous, with a large patch on the disc below the base, and a common broad subapical fascia, green.

Pic (Mélanges exot.-entom. xxx. p. 11, 1919) includes *H. festivus*, Er., and its allies in a new subgenus, *Cladapalochrus*; but he has presumably incorrectly identified the ♂ of *H. festivus*, which has simply serrate (not flabellate) antennæ in that sex, as in *H. longior*.

H. senegalensis, Pic (type ♂, with flabellate antennæ, 1912), and *H. viridipes*, Pic (type ♀, 1912), from W. Africa, and *H. degeorgisi*, Pic (type ♀, 1914), from the Congo, are maculate forms that do not seem to be represented in the collections before me.

6. *Hapalochrus sjöstedti.*

Hapalochrus sjöstedti, Bourg. in Sjöstedt's Kilimandjaro-Meru Exped. i. Abt. 7, No. 10, p. 132, t. 3. fig. 15 (♂) (1908) (nec *Apalochrus sjöstedti*, var. *diversipes*, Pic, Mélanges exot.-entom. xxxi. p. 10, Oct. 1919).
Var. *Hapalochrous simplicipes*, Pic, Ann. Soc. Ent. Belg. liii. p. 193 (♂) (1909).

♂. Moderately elongate, shining, somewhat thickly clothed with fine, semi-erect, whitish hairs; cæruleous, bluish-green, or violaceous, the antennæ black, with the two basal joints entirely or in part testaceous; the anterior and intermediate legs wholly or in part (usually black along their outer aspect), and sometimes the posterior tarsi also, testaceous, the rest of the legs metallic or black, the abdomen almost entirely reddish or testaceous. Head broad, closely punctulate, smoother at the base; antennæ long, stout, pectinate from the fourth joint onward. Prothorax transverse, subtrapezoidal as seen from above, at the base as wide as the elytra, sparsely punctulate, smooth on the middle of the disc. Elytra widened posteriorly, densely, rather finely, rugulosely punctate, the puncturing a little coarser in specimens from Kilimandjaro and Kenya. Anterior femora incrassate, toothed at the middle; anterior tibiæ simply excavate towards the apex within (thus appearing strongly sinuate), without projecting lobe at the middle; anterior tarsal joints 1 and 2 thickened, 2 projecting over 3, nigro-pectinate at tip; intermediate tibiæ simple.

♀. Antennæ short, rather stout, serrate; legs, and abdomen in part, metallic or black, the anterior femora without tooth and sometimes testaceous.

Length 4¼–6, breadth 2–3$\frac{1}{10}$ mm. (♂ ♀.)

Hab. E. AND W. CENTRAL AFRICA, Kilimandjaro and Meru (*Dr. Sjöstedt*: types of *H. sjöstedti*: ♂ ♀), S. foot of Mt. Elgon and S.E. slopes of Kenya, alt. 5100–7000 ft., Koki Country, S.W. Buddu, Banks of Nile near Kakindu, Bugoma Forest in Unyoro, Upper Kuja Valley in S. Kavirondo, and E. Busoga in Uganda (*S. A. Neave*), Tero Forest in Uganda (*C. C. Gowdey*); BELGIAN CONGO (type of *H. simplicipes*: ♂), Vivi, Léopoldville, Congo da Lemba, Amadi, Itoka, and between Beni and Lesse (*Mus. Congo Belge*), Congo (*coll. Bourgeois*); W. AFRICA, Ibadan in S. Nigeria (*A. W. J. Pomeroy*), Ashanti District (*A. E. Evans*).

The above description was drawn up from a short series in the British Museum before the types (♂) of Bourgeois and Pic had been forwarded to me by Dr. Sjöstedt and M. Schouteden for comparison: *H. sjöstedti* has the elytra a little more coarsely punctured than *H. simplicipes*, but no other difference can be detected. There are about thirty specimens of *H. simplicipes*, Pic (including the type), in the Congo Museum, the sexes in about equal numbers. The females are separable from those of various similarly coloured *Hapalochri* by the basally widened prothorax.

7. *Hapalochrus trapeziderus*, sp. n.

♂. Moderately elongate, shining, albo-pilose; green or brassy green, the antennæ and legs black or metallic, the basal joint of the antennæ beneath, the anterior and intermediate femora in part, and the anterior tibiæ on their inner aspect, testaceous, the abdomen in great part red. Head broad, closely punctulate; antennæ long, stout, pectinate from the third joint onward. Prothorax broad, as wide as the elytra at the base, subtrapezoidal as seen from above, sparsely punctulate, smooth and canaliculate on the middle of the disc. Elytra widened posteriorly, densely, rugosely punctate; the apices almost smooth, dehiscent, compressed and angulate at some distance from the sutural angle (? abnormally formed). Anterior femora incrassate, toothed at the middle beneath; anterior and intermediate tibiæ strongly sinuate, the latter deeply excavate near the apex within; anterior tarsal joints 1 and 2 thickened, subequal in length.

♀. Antennæ rather short, not very stout, feebly serrate, their joints 1–3, and the anterior and intermediate femora to near the apex, testaceous; abdomen red; anterior femora without tooth.

Length 4¾–6½, breadth 2½–3⅓ mm. (♂ ♀.)

Hab. E. Africa, Njoro (*R. H. Deakin*: ♂: vi. 1914), Ruiru (*T. J. Anderson*: ♀: xi. 1917).

One pair, the ♂, type, labelled as having been found in the cocoon of a "bagworm" (Psychid moth), the ♀ much smaller, the two sexes with similarly-coloured legs. Separable from *H. sjöstedti* by the apically emarginate intermediate tibiæ and the darker legs of the male, and the partly testaceous anterior and intermediate femora of the female, the male relatively broader.

8. *Hapalochrus simoni.*

? *Hapalochrus simoni*, Pic, Melanges exot.-entom. v. p. 6 (♂) (March 1913).

♂. Moderately elongate, convex, shining, somewhat thickly clothed with fine, whitish, semi-erect hairs; cæruleous, the antennæ (the slightly infuscate apical joints excepted), palpi, labrum, and legs testaceous, the abdomen rufo-testaceous. Head broad, closely punctate; antennæ moderately long, stout, pectinate from the fourth joint onward. Prothorax transverse, convex, laterally compressed, subtrapezoidal (as seen from above), sparsely punctate, impressed before the base. Elytra very little broader than the prothorax, widened posteriorly, densely, rugulosely, rather finely punctate. Anterior femora (Pl. VIII. fig. 1) incrassate, toothed at the middle beneath; anterior tibiæ (Pl. VIII.

fig. 1) twisted and dilated obliquely into a short, stout, convex lobe at about the middle above, the lobe concave beneath, the outer portion of the tibia narrow and compressed; anterior tarsal joints 1 and 2 thickened, subequal in length, 2 projecting over 3 and nigro-pectinate at the tip; intermediate tibiæ rather slender, slightly sinuate within.

Length 4½, breadth 2¼ mm.

Hab. W. Africa, Gold Coast (*A. E. Evans*), Quingua (*E. Simon, type of Pic*).

A ♂ from the Gold Coast, received by the British Museum in 1913, is apparently referable to *H. simoni*. A bright blue, rather convex, albo-pilose insect, with the antennæ, legs, and abdomen testaceous, the antennæ pectinate, the anterior femora toothed and incrassate, the anterior tibiæ twisted and shortly, obliquely lobed at the middle, the intermediate tibiæ slender and sinuate within. A much larger ♀ (length 6¼, breadth 3¼ mm.), from Sierra Leone, in the same collection, may belong to the present species: it has however, the antennæ (except the basal joint beneath) and legs black, and the head and the sides of the prothorax more densely punctured. The ♂ is separable from that of *H. sjöstedti* (*simplicipes*, Pic) by the testaceous legs and antennæ, the mesially dilated anterior tibiæ, and the more convex body. *H. pectinatus*, Pic (1911), type ♂, from Shirati, is an allied form with pectinate antennæ in ♂. The locality "Quingua" cannot be traced on any map available to myself.

9. *Hapalochrus lobipes*, sp. n.

♂. Extremely like *H. sjöstedti*, Bourg., var. *simplicipes*, Pic, and similarly coloured—green, with the anterior and intermediate legs, the antennæ in part, and the abdomen testaceous; the anterior tibiæ (Pl. VIII. fig. 6) strongly bifurcate at the middle, the outer lobe long, broad, rounded at the tip, the inner compressed distal portion of the tibia narrow; the anterior femora (Pl. VIII. fig. 6) toothed at the middle; the elytral puncturing rather fine.

Length 5½, breadth 3 mm.

Hab. W. Central Africa, Tolo, Belgian Congo (*Dr. J. Maes, in Mus. Congo Belge*: xii. 1913).

One male. The lobe of the anterior tibiæ is more developed in this insect than in any other *Hapalochrus* before me, *H. simoni* forming a sort of connecting-link between *H. simplicipes* and *H. lobipes*. A distinctive name is therefore required for the specimen from Tolo.

10. *Hapalochrus dasytiformis*, sp. n.

♂. Moderately elongate, narrow, parallel-sided, shining, clothed with whitish pubescence intermixed with long, soft, erect, pallid hairs; nigro-æneous or black, the basal joints of the antennæ beneath, the mandibles (except at the tip), tibiæ, and tarsi (their apices excepted) testaceous. Head broad, sparsely punctured; antennæ moderately long, strongly pectinate. Prothorax strongly transverse, convex, about as broad as the base of the elytra, rounded at the sides, very sparsely punctate, foveate or sulcate in the middle posteriorly. Elytra closely, finely punctate, depressed along the suture anteriorly, the interspaces alutaceous and uneven. Anterior femora (Pl. VIII. fig. 2) strongly incrassate, toothed towards the base; anterior tibiæ (Pl. VIII. fig. 2) thickened and rather broad, abruptly, obliquely compressed and emarginate before the tip; anterior tarsal joints 1 and 2 thickened, 2 smaller and much shorter than 1, extending over the base of 3, nigro-pectinate at tip; intermediate tibiæ simple, as in ♀.

♀. Antennæ shorter and more slender, serrate, black.

Length $3\frac{1}{5}$–4, breadth $1\frac{1}{2}$–$1\frac{2}{3}$ mm. (♂ ♀.)

Hab. S.E. AFRICA, Howick, Natal (*J. P. Cregoe*).

Five males and one female, received by the British Museum in 1903. A small, narrow, hairy, nigro-æneous or black form, with testaceous tibiæ and tarsi, and a broad, transverse prothorax, the ♂ with flabellate antennæ, incrassate, toothed anterior femora (as in *H. sjöstedti*, Bourg.), thickened and obliquely compressed anterior tibiæ, &c. The ♀ is separable from the same sex of the Rhodesian *H. dollmani* (No. 58) by its smaller size, less elongate shape, shorter prothorax, and more distinctly, less densely punctate elytra.

11. *Hapalochrus atratus*, sp. n.

♂. Moderately elongate, narrow, shining, sparsely pubescent and also thickly clothed with long, soft, erect, fuscous hairs; black, the elytra with a faint cyaneous lustre, the basal joints of the antennæ and the anterior tibiæ slightly testaceo-maculate. Head short, bi-impressed anteriorly, sparsely punctulate; antennæ moderately long, strongly pectinate from the fourth joint onward. Prothorax transverse, sulcate down the middle, sparsely punctate. Elytra subparallel, depressed along the suture below the base, closely, finely punctate. Anterior femora (Pl. VIII. fig. 5) armed with a long sharp tooth near the base; anterior tibiæ (Pl. VIII. fig. 5) strongly sinuate, compressed, dilated to beyond the middle, the apical portion abruptly, obliquely narrowed ; anterior tarsal joints 1 and 2 slightly thickened, 2 extending over the base of 3 ; intermediate tibiæ simple, as in ♀.

♀. Antennæ much shorter, not so stout, sharply serrate ; elytra widened posteriorly : legs wholly black.

Length 3–4¼, breadth 1⅕–2 mm. (♂ ♀.)

Hab. E. Africa, Mwengwa [i., ii. 1914] and Kashitu [i. 1915] in N.W. Rhodesia (*H. C. Dollman*).

A long series, the sexes in about equal numbers. all but one from Mwengwa. A small, narrow, shining black form, the elytra with a faint bluish lustre, the ♂ with subparallel elytra, strongly pectinate antennæ, sharply toothed anterior femora, twisted and dilated anterior tibiæ, and simple intermediate tibiæ. In the ♂ of this insect the long tooth on the front legs arises from near the base of the femora, not from the trochanter as usual (when present) in the present genus.

12. *Hapalochrus ramulosus*, sp. n.

♂. Moderately elongate, narrow, subparallel, shining, finely pubescent, with long, erect hairs intermixed ; brassy-cupreous or golden-green, the antennæ and femora black, the basal joints of the former beneath, and the mouth-parts, tibiæ, tarsi in great part, and ventral sutures testaceous. Head densely, rugosely punctate ; antennæ long, strongly pectinate. Prothorax transverse, rounded at the sides, closely, finely punctate on the disc, the lateral portions rugose. Elytra subparallel, flattened on the disc, densely, finely, rugosely punctate. Anterior tibiæ simple ; anterior tarsal joints 1 and 2 rather elongate, slightly thickened, 2 produced above and nigro-pectinate at the tip ; intermediate tibiæ gradually widened to about the middle and narrowing thence to the apex.

Var. Posterior tibiæ entirely, and the other tibiæ at the apex, black. (♂.)

♀. Antennæ short, serrate ; elytra widened posteriorly ; tibiæ in their outer half, and the tarsi almost entirely, black.

Length 4–4½, breadth 1½–1⅘ mm. (♂ ♀.)

Hab. E. Africa. Kafue River, Namwala, N. Rhodesia (*H. C. Dollman* : ♂ ♀ : iii. 1913), Nyasa (*Thelwall, in Mus. Brit.* : ♂).

One pair from Rhodesia (types) and a ♂ from Nyasa. A narrow, brassy-cupreous or golden-green form, with the head, the sides of the prothorax, and the elytra rugosely punctured, the ♂ with pectinate antennæ, simple anterior tibiæ, and slightly thickened, partly testaceous intermediate tibiæ. The legs, as is often the case in the present genus, vary in colour, the Nyasa ♂ having the posterior pair entirely, and the anterior and intermediate tibiæ at their apices (as in the Rhodesian ♀), black. The Nyasa specimen (♂) was received at the British Museum in 1877. *H. ramulosus* seems to be allied to *H. pectinatus*, Pic (1911), types (♂ ♀) from Shirati, E. Africa; but as the latter is described as bluish-black in colour, and the narrow shape is not mentioned, the two insects are scarcely likely to be conspecific.

13. *Hapalochrus abyssinicus.*

Hapalochrus abyssinicus, Harold, Monatsb. Akad. Wiss. Berl. 1878, p. 219 (♂ ♀).
Hapalochrous major, Pic, Ann. Soc. Ent. Belg. li. p. 385 (1907) (♂).

♂. Extremely like the same sex of *H. elgonensis*, but a little larger and more robust, the head narrower than the prothorax, the latter relatively broader, the colour still more variable—golden-green, or in part cyaneous, the elytra rarely brassy-cupreous, the basal joints of the antennæ, the palpi (except at the tip), and all the tibiæ and the basal joint of each tarsus (as well as the epistoma and labrum) wholly testaceous in nearly all the specimens from N.W. Rhodesia, the intermediate tibiæ always in great part testaceous, the sides of the abdomen rufescent; the puncturing of the elytra finer and denser; the epistoma similarly swollen and almost smooth, but with the oblique lateral portions somewhat curved; anterior tibiæ slightly hollowed towards the apex within; intermediate femora curved; intermediate tibiæ (Pl. VIII. fig. 4) greatly swollen, convex and broad to very near the apex above, deeply excavate within, angulate on their lower outer edge at about the middle, and furnished with a dentiform, matted tuft of hairs near the inner apical angle.

♀. Head metallic to the anterior margin, the epistoma flattened; antennæ (except at the base beneath) and legs sometimes black or metallic, the tibiæ testaceous in the Kasitu examples, the antennæ much shorter than in ♂.

Length 7–8½, breadth 3¼–3¾ mm. (♂ ♀.)

Hab. W.C. Africa, Moliro and Mpala (*Duvivier*; type of Pic: ♂), Road from Luena, Sassa, and Amadi, Congo (*Mus. Congo Belge*: ♂); E. Africa, Ndala Mission, 33° 15′ E., 4° 45′ S. (*Dr. G. H. Carpenter*: xii. 1916—

i. 1917 : ♂), Yala River, S. edge of Kakumga Forest, alt. 4800–5300 ft. [♂], Nyangori in N. Kavirondo, alt. 4800 ft. (*S. A. Neave* : v. 1911 : ♂), Mlanje [i. 1913 : ♂] and between Mangoche and Chikala Boma, alt. 4000 ft. [iii. 1910 : ♀], in Nyasaland (*S. A. Neave*), Kashitu and Namwala in N.W. Rhodesia (*H. C. Dollman* : iii. 1913, xi., xii. 1914, i. 1915 : ♂ ♀) ; ABYSSINIA (*types of Harold* : ♂ ♀).

The above description is taken from a series of fourteen males and four females belonging to the British Museum. The males agree with a specimen of *H. major* from the Congo named by Pic, and they are separable from the same sex of *H. elgonensis* by the form of the intermediate tibiæ, which are convex and broad to very near the apex above, and have the dentiform tuft of matted hairs placed near the tip. The tibiæ and the basal joints of the antennæ and tarsi vary in colour, these portions of the legs being wholly or in great part testaceous in the Rhodesian series received from the late H. C. Dollman. The colour of the upper surface, too, is variable, as stated by Harold, the elytra being brassy cupreous in a pair from Nyasaland. Dr. Gestro has lent me a ♀ from Abyssinia agreeing with Harold's diagnosis and with the other specimens before me of the same sex, and the only discrepancy between the description of the Congo insect and the one from Abyssinia is that Harold did not state that the yellowish anterior border of the head (epistoma) was swollen. *H. opulentus*, Péring. (1892), types, ♂ ♀, length 8–9 mm., from N. Ovampoland, is an allied form with the head wholly green in ♂*.

14. *Hapalochrus elgonensis*, sp. n.

♂. Moderately elongate, robust, shining; cyaneous, green, or golden-green, the palpi and joints 2–10 of the antennæ black, joints 1–3 of the latter testaceous beneath, 1 with a green streak above, the epistoma and labrum, the excavate inner portion of the intermediate tibiæ (including the pencil of hairs), and the abdomen at the sides and middle anteriorly, testaceous or rufescent ; clothed with shaggy whitish pubescence intermixed with numerous long, fine, pallid, erect hairs. Head nearly as wide as the prothorax, densely, very finely punctate, and deeply, transversely depressed between the eyes, smoother at the base, the epistoma swollen and almost impunctate (the tumid space forming a ⊓-shaped flavescent ridge between the bases of the antennæ) ; antennæ subserrate, long, rather stout, joints 2–9 elongate. Prothorax much broader than long, very sparsely punctulate, deeply, transversely grooved before the base. Elytra long, flattened on the disc anteriorly, gradually widened posteriorly, bluntly rounded at the apex; densely, finely, rugosely punctate. Anterior tibiæ rather slender, hollowed towards the apex within; anterior tarsal joints 1 and 2 thickened, 2 extending over 3; intermediate femora concave beneath, slightly curved; intermediate tibiæ (Pl. VIII. fig. 8) greatly swollen, convex above, rounded externally, deeply excavate and sinuate within, and furnished with a matted, dentiform tuft of hairs at a little behind the middle.

♀. Head metallic to the anterior margin, the epistoma flattened, the transverse depression shallower; antennæ much shorter; legs wholly metallic.

Length 6–7, breadth 2¾–3 mm. (♂ ♀.)

Hab. E. AFRICA, S. foot and slopes of Mt. Elgon, alt. 5100–5800 ft. [♂ ♀: 8–13. vi. 1913], and Siroko River, near W. foot of Mt. Elgon, alt. 3600 ft., in Uganda [♀: 12–14. viii. 1911] (*S. A. Neave*).

Thirty-one specimens, three only of which are males. Recognizable in this sex by the tumid, flavescent epistoma, and the greatly swollen curved intermediate tibiæ, which bear a matted dentiform tuft of testaceous hairs near the middle. A close ally of *H. abyssinicus* and *H. constrictipes*, the only other allied forms known to me with a flavescent tumid epistoma in ♂, this character separating *H. elgonensis* from the same sex of *H. malachioides*, the epistoma in the latter being flattened.

15. *Hapalochrus constrictipes*, sp. n.

♂. Elongate, robust, shining; green, the head, prothorax, and base and sides of the elytra tinged with cyaneous, the epistoma, labrum, basal joint of antennæ, palpi (except at tip), anterior and intermediate femora (except a streak on the anterior pair above) and tibiæ, posterior femora at the base and the tibiæ in part, and the ventral surface (except down the middle), testaceous; thickly clothed with shaggy whitish pubescence intermixed with long, erect, pallid hairs. Head narrower than the prothorax, densely, very finely punctate and transversely depressed between the eyes, smoother at the base, the epistoma greatly swollen and almost impunctate (the lateral portions forming a prominent, oblique, flavescent ridge on each side before the eyes); antennæ moderately long, subserrate. Prothorax transverse, sparsely punctured, smoother on the middle of the disc. Elytra much widened posteriorly, blunt at the tip; densely, rugulosely punctate, the punctures coarser at the base. Anterior tibiæ strongly sinuate within; anterior tarsal joints 1 and 2 thickened, 2 extending over 3, nigro-pectinate at tip; intermediate tibiæ (Pl. VIII. fig. 10) greatly swollen, convex above, deeply excavate within, abruptly constricted towards the apex (thus appearing angulate beyond the middle externally and subdentate at the tip beneath), and furnished with a matted, dentiform, tuft of hairs (followed by another smaller tuft) beyond the middle.

Length 7½–8, breadth 3¼–3⅓ mm.

Hab. W. CENTRAL AFRICA, Bondaye, Kamerun (*Mus. Brit.*), Limbala, Belgian Congo (*Dr. Rodhain, in Mus. Congo Belge*: 5. viii. 1913).

Two males, the one from Bondaye captured on May 27th, 1914. Separable from the same sex of *H. abyssinicus* (=*major*, Pic) and *H. elgonensis* by the apically constricted, externally angulate intermediate tibiæ, the dentiform tuft of hairs on their inner aspect placed in the same position as in *H. elgonensis*. A ♀ from Kambove, Katanga (*S. A. Neave*), cupreous above, and another from Welgelegen, Belgian Congo (*Dr. Bequaert*), green, with the sides of the elytra violaceous, probably belong to the same species. These three forms agree in having a tumid, flavescent, almost smooth epistoma in ♂.

16. *Hapalochrus malachioides.*

Hapalochrus malachioides, Fairm. Ann. Soc. Ent. Fr. 1887, p. 159.
Hapalochrous conradti, Pic, *in litt.* (♂).

♂. Elongate, robust, shining; green, with the prothorax or base of the elytra suffused with violaceous or cyaneous, the bluish colour sometimes extending to the apex of the latter, the epistoma, mouth-parts, palpi (except at tip), the antennal joints 1–3 (except a dark streak along their upper face), the anterior tarsi at the base, the anterior tibiæ in part, the intermediate femora beneath, the intermediate tibiæ except along their outer face, and sometimes the ventral segment to a greater or lesser extent, testaceous; clothed with whitish pubescence intermixed with long, erect hairs. Head about as wide as the prothorax, transversely depressed and feebly canaliculate between the eyes, densely, finely punctate, smoother at the base, the epistoma flattened;

antennæ very long, feebly serrate. Prothorax transverse, rounded at the sides, sparsely, finely punctate, smoother on the disc. Elytra widened posteriorly, densely, rather coarsely, rugulosely punctate, the puncturing coarser and more diffuse at the base, the apices rounded. Anterior tibiæ hollowed in their outer half within (appearing thickened at the tip); anterior tarsal joints 1 and 2 thickened, 2 extending over 3, nigro-pectinate at tip; intermediate tibiæ (Pl. VIII. fig. 11) greatly swollen, convex and rounded externally, furnished with a broad, thin, rounded flavo-ciliate lamella on their inner face beyond the middle, and deeply excavate above and beneath this, the lower, outer edge (as seen from beneath) biangulate.

♀. Head metallic to the anterior margin; antennæ much shorter; legs wholly metallic.

Length 6¼–7½, breadth 2½–3½ mm. (♂ ♀.)

Hab. E. AND E. CENTRAL AFRICA: Tabora (*type of Fairmaire*), Mitiana—Entebbe, Yala River, S. edge of Kakumga Forest, S. foot and slopes of Mt. Elgon, Koki Country, S.W. Buddu, N. of L Isolt, valley of Kafu River, Unyoro, Ilala, Maramas District, Upper Kuja in S. Kavirondo, alt. 3400–5800 ft. (*S. A. Neave*), Entebbe, Mwera (*C. C. Gowdey*); W. CENTRAL AFRICA, Bondayo, Babua, Kongola Kunde, Kamerun (*Mus. Brit.*); Congo da Lambra, Amadi, Kisantu, Kibombo, Belgian Congo (*Mus. Congo Belge*).

This insect seems to be referable to *H. malachioides*, Fairm., the type of which (♀) was from Tabora, and there are specimens of it (♂ ♀) in the Congo Museum thus identified by Pic, as well as others named by him *H. conradti*. The Congo Museum also possesses a series of about 150 examples of it, including 70 males, taken by Mr. R. Mayné in 1913 at Congo da Lemba, and there are many others from Uganda, Kamerun, &c., in the British Museum. The ♂ of the present insect is recognisable by the very long antennæ, the flavescent, flattened epistoma, and the ciliate flavo-unilamellate intermediate tibiæ, the tibiæ themselves being greatly swollen. The ♀ ♀ of *H. malachioides* and its allies, all of which have the head metallic to the anterior margin, are scarcely distinguishable one from another.

17. *Hapalochrus uncinatus*, sp. n.

♂. Elongate, widened posteriorly, shining; green, the anterior portion of the head and the sides of the prothorax golden-green, the elytra tinged with cyaneous at the sides and base, the labrum, the outer angles of the epistoma, the basal joints of the antennæ beneath, the palpi (except at the tip), the trochanters, the femora at the base or beneath, the intermediate tibiæ within, and the abdomen in part, testaceous; clothed with whitish hairs intermixed with long, erect, blackish setæ. Head densely punctulate and transversely depressed anteriorly, much smoother at the base; antennæ long, slender. Prothorax nearly as long as broad, sparsely punctate on the disc, rugulose at the sides. Elytra densely, rugulosely punctured. Anterior tibiæ abruptly, subarcuately dilated and compressed in their apical third; anterior tarsal joints 1 and 2 stout, 2 extending over 3; intermediate tibiæ (Pl. VIII. fig. 12) curved, enormously thickened, rounded and convex externally, abruptly narrowed at the apex, very deeply excavate within and deeply sinuato-sulcate along the median third above, the upper inner edge armed at the middle with a stout, compressed, forwardly-directed, acute hook, and the lower inner edge arcuately lamellate opposite this.

Length $6\frac{4}{5}$, breadth $3\frac{1}{5}$ mm.

Hab. W. Central Africa, Katalla, Belgian Congo (*Dr. Rodhain, in Mus. Congo Belge*): 10. i. 1911.

One male. Very near the insect here identified as *H. spectabilis*, Ancey, but readily distinguished from the ♂ of that species by the stout, chitinous hook at the middle of the inner edge of the intermediate tibiæ, the corresponding appendage being formed by a tuft of matted hairs in *H. elgonensis, abyssinicus,* and *constrictipes,* and by a thin ciliated lamella in *H. malachioides.*

18. *Hapalochrus bilamellatus*, sp. n.

♂. Elongate, robust, shining; golden-, brassy-, or bluish-green, the elytra sometimes suffused with cyaneous at the base or sides, the labrum, the basal joint of the antennæ on its outer edge, the intermediate tibiæ on its inner aspect from the middle to the apex, and the abdomen in part, testaceous; clothed with whitish pubescence intermixed with numerous long, erect hairs. Head densely punctulate and transversely depressed anteriorly, smoother at the base; antennæ moderately long, rather strongly serrate from the fifth joint onward. Prothorax transverse, sparsely punctulate. Elytra much widened posteriorly, bluntly rounded at the apex, densely, finely, rugulosely punctate. Anterior tibiæ slightly hollowed at about the middle within; anterior tarsal joint 2 much longer than 1, thickened and pectinate at tip; intermediate tibiæ (Pl. VIII. fig. 13) swollen, strongly curved, convex externally, deeply excavate on their inner aspect, the upper and lower edges of the cavity arcuately dilated at the middle, the dilated upper portion extending for some distance inward, sinuate-plicate, and very deeply excavate, the lower portion narrower and less prominent.

♀. Antennæ very much shorter and a little stouter; legs wholly metallic.

Length $6\frac{1}{4}$–7, breadth $2\frac{9}{10}$–$3\frac{1}{5}$ mm. (♂ ♀.)

Hab. E. AFRICA: Nandi Escarpment [type], Yala River, south edge of Kakumga Forest, and Valley of the Upper Nzoia River, N. Kavirondo, alt. 4800–5800 ft. (*S. A. Neave*: v., vi. 1911); Luwumbu Valley, Upper Luangwa, alt. 2500–3500 ft. [vii. 1910], and Serenje District, alt. 4500 ft. [xii. 1907], both in N.E. Rhodesia (*S. A. Neave*); Kashitu in N.W. Rhodesia (*H. C. Dollman*: xii. 1914). CENTRAL AFRICA: Kundelungu, Belgian Congo (*Dr. Bequaert, in Mus. Congo Belge*: ♂).

Numerous examples, including seven males, two of which are from Rhodesia. These males differ from the same sex of the Usagara insect here referred to *H. spectabilis*, Ancey, in having the antennæ more strongly serrate, the prothorax more rounded at the sides, and the lamella on the upper inner edge of the intermediate tibiæ broader and more prominent than the lower one, the inner margin only of the former testaceous.

19. *Hapalochrus cochleatus*, sp. n.

♂. Very like, and possibly a form of, *H. bilamellatus*, but differing chiefly in the development of the intermediate tibiæ (Pl. VIII. fig. 14), the lower lamella of which is larger and more angular, and the upper one narrow, more or less angulate proximally, and sinuato-plicate and deeply sulcate above; the antennæ, too, are a little longer, and have the apical joint strongly curved and more elongate.

Length $6\frac{1}{5}$–7, breadth $2\frac{1}{5}$–$3\frac{1}{2}$ mm. (♂ ♀.)

Hab. E. AND W. CENTRAL AFRICA, Mwengwa [type] and Kashitu, N.W. Rhodesia (*H. C. Dollman*: xi., xii. 1913, xi., xii. 1914, i. 1915: ♂ ♀), Serenje, N.E. Rhodesia (*S. A. Neave*: xii. 1907); Babua Boudaye, Kongola Kunde, Kamerun (*Mus. Brit.*); Mufungwa Sampwe (*Dr. Bequaert*), Sankisia, Belgian Congo (*Dr. Rodhain, in Mus. Congo Belge*: ♂).

Twenty specimens, including males from each district. In this insect the two lamellæ of the ♂ intermediate tibiæ, viewed from above, appear to be placed one before the other, the narrow angulate portion of the upper one issuing at about one-third from the base. The females of these closely allied forms are scarcely distinguishable *inter se*; some of those from Serenje are very hairy and closely resemble the same sex of *H. abyssinicus*, from which they are separable by their smaller size, and shorter elytra and antennæ.

20. *Hapalochrus spectabilis.*

? *Apalochrus spectabilis*, Ancey, Nat. Sicil. ii. p. 116 (1883).

♂. Elongate, robust, shining; bluish-green or cyaneous, the elytra sometimes with a large violaceous patch on the outer part of the disc, the mouth-parts, the outer angles of the epistoma, the basal joints of the antennæ beneath, the anterior and intermediate tibiæ within, the intermediate femora beneath, and the ventral segments in great part, testaceous; clothed with whitish pubscence intermixed with long, erect, darker hairs. Head somewhat densely punctulate and transversely depressed anteriorly, smoother at the base; antennæ long, rather slender, feebly serrate. Prothorax broader than long, subrotundate, very sparsely punctulate. Elytra long, much widened posteriorly, flattened on the disc, densely, rugulosely punctate, the apices bluntly rounded. Anterior tibiæ sinuate, excavate in their outer half within, the apical portion (as seen from behind) abruptly widened for some distance; anterior tarsal joints 1 and 2 thickened, 2 extending over 3; intermediate tibiæ (Pl. VIII. fig. 15) greatly swollen, convex and rounded externally, deeply excavate within, the upper and lower edges of the cavity dilated behind the middle into a prominent rounded lamella, the upper one sinuato-plicate and also deeply excavate above.

♀. Antennæ a little stouter and much shorter; prothorax more transverse; the head entirely, legs, and sometimes the abdomen also, metallic.

Length 6⅕–6¾, breadth 2⅘–3½ mm. (♂ ♀.)

Hab. E. Africa, Road to Kilossa, Usagara District, alt. 1500 to 2500 ft. (*S. A. Neave*): 22–26. xii. 1910).

Six males and five females, found by Dr. Neave, are provisionally referred to this species, the types (? ♀ ♀) of which were from Usagara. Ancey does not mention the sexual characters and gives no measurements; he compares his insect with *H. festivus*, Er., from W. Africa, and states that it is one of the largest of the Malachiids. The colour is variable, above and beneath. This is one of several species with bi-lamellate, swollen intermediate tibiæ in ♂, the tibiæ themselves being greatly swollen in the present insect.

21. *Hapalochrus nitens.*

Apalochrus nitens, Gorh. Ann. & Mag. Nat. Hist. (7) v. p. 79 (♂ ♀) (1900).

♂. Antennæ elongate, rather slender, strongly serrate from joint 4 onward; anterior tibiæ slightly hollowed towards the apex within, the apical portion rather broad; anterior tarsal joints 1 and 2 elongated, 2 thickened and nigro-pectinate at the apex; intermediate tibiæ (Pl. VIII. fig. 16) greatly swollen, curved, convex externally, deeply excavate within, the upper and lower edges of the cavity strongly, subequally, arcuato-lamellate at about the middle, the upper lamella sinuato-plicate and also deeply excavate.

♀. Antennæ a little stouter, feebly serrate, short; legs usually much darker, the anterior and intermediate pairs (the bases of the tarsi included) often wholly or in great part testaceous in ♂.

Length (head extended) 5½–6, breadth 2¼–2½ mm. (♂ ♀.)

Hab. E. AND S.E. AFRICA: Mwengwa in N.W. Rhodesia (*H. C. Dollman*: i., ii. 1914); Fort Jameson District, alt. 4000 ft. in N.E. Rhodesia (*S. A. Neave, in Mus. Oxon.*: viii. 1908); Bulawayo [xii. 1903] and Salisbury [i. 1899] (*G. A. K. Marshall*).

The long series, ♂ ♀, obtained by Dr. Marshall and the late H. C. Dollman, the males agreeing perfectly in their structure, vary greatly in the colour in the body (golden-green, green, cyaneous or violaceous, some examples having the head and prothorax green and the elytra cyaneous) and legs, many of the Rhodesian females (but not all of them) having these limbs darker than those from the other localities. Gorham briefly described the sexes, but his definition "erosis" of the ♂-intermediate tibiæ gives one no idea of the bilamellate structure. Some of the specimens are labelled as having been found on grass-seeds. Compared with *H. bilamellatus* and other allied forms with somewhat similar ♂-characters, *H. nitens* is a relatively narrower, smaller insect. A ♀ from Kambove, Katanga (*S. A. Neave*), may also belong here.

22. *Hapalochrus clavicornis*, sp. n.

♂. Moderately elongate, cyaneous, the head and prothorax bluish-green in one example, the basal joint of the antennæ beneath, a space at the middle of the anterior tibiæ, and the base of the intermediate femora narrowly, testaceous, the rest of the antennæ and legs (the claws excepted) black or metallic, the abdomen partly red ; clothed with fine pubescence intermixed with longer, semi-erect, pallid hairs. Head about as wide as the prothorax, rather sparsely punctulate, sulcate down the middle anteriorly, depressed between the eyes, and deeply, transversely excavate on each side posteriorly, the two excavations narrowly separated along the median line; antennæ moderately long, not very slender, joints 3–9 flattened, parallel-sided, oblong, 10 dilated, flattened, somewhat oval, much wider than 9, bluntly rounded at tip. Prothorax transverse, convex, rounded at the sides, closely punctulate. Elytra widened and rather convex posteriorly, conjointly rounded at the apex, deeply punctate. Anterior tibiæ widened, sinuate, obliquely compressed, and with a narrow diaphanous space on their inner edge, before the tip; anterior tarsal joints 1 and 2 slightly thickened, long, 2 extending over the base of 3; intermediate femora hollowed towards the apex and deeply excavate near the base beneath; intermediate tibiæ (Pl. VIII. fig. 17) curved, broad, convex above, arcuately dilated at the middle externally and sinuate thence to the tip, deeply excavate at the middle and apex beneath, and furnished with a dentiform pencil of matted pallid hairs at the inner angle, the apex itself toothed beneath.

♀. Antennæ a little more slender; head densely punctate, simply hollowed down the middle posteriorly and transversely depressed anteriorly ; legs wholly metallic.

Length $4\frac{3}{4}$–$5\frac{1}{4}$, breadth 2–$2\frac{1}{10}$ mm. (♂ ♀.)

Hab. E. AFRICA, Mwengwa [1. i. 1914] and Kafue River, Namwala [iii. 1913], both in N. or N.W. Rhodesia (*H. C. Dollman*).

Two pairs, found on grass. This species may be readily identified by the dilated apical joint of the antennæ in the two sexes, and the deeply excavate head and the very peculiarly-formed intermediate tibiæ in the ♂. *H. cavifrons*, Pic (1913), from the Congo, seems to have the head excavate as in *H. clavicornis*, and antennæ dilated somewhat as in *H. platycerus* (No. 35).

23. *Hapalochrus dilaticornis*, sp. n.

♂. Moderately elongate, clothed with whitish pubescence, the elytra with short semi-erect hairs; bluish-green, the labrum, palpi, joints 1–5 of the antennæ, anterior and intermediate femora and tibiæ, and posterior tibiæ (except towards the apex), testaceous, the rest of the antennæ and legs black or metallic. Head short, broad, densely punctulate, opaque ; antennæ long, very broadly dilated, joints 4–9 strongly transverse, oblique, 3 triangular. Prothorax convex, transverse, about as wide as the head, obliquely narrowed posteriorly, shining, sparsely, very finely punctulate. Elytra long, a little broader than the prothorax, slightly widened posteriorly, shining, densely, rugulosely punctate, smoother at the base. Anterior trochanters produced into a short point; anterior femora with a small tooth at the base; anterior tibiæ twisted, broadly, obliquely dilated and excavate at the middle; anterior tarsal joints 1 and 2 thickened, 2 extending over 3; intermediate femora broadly excavate at the base beneath; intermediate tibiæ (Pl. VIII. fig. 18) greatly thickened, widening outwards, deeply, abruptly excavate in their apical third within, and furnished with a long, curved, narrow, compressed appendage near the inner angle and a slightly shorter appendage beneath the outer angle, the apex appearing bilobate when viewed from behind.

Length 4½, breadth 2 mm.

Hab. W. AFRICA, Onitsha in S. Nigeria (*J. A. de Gaye*: vii. 1910).

One male. Extremely like *H. testaceicornis*, Pic (1914), a ♂ of which, from Nyangwe on the Congo, named by the author, has been lent me by M. Schouteden; but differing from it in the longer and more broadly dilated antennæ, the testaceous intermediate femora and tibiæ, the tibiæ with longer apical appendages and wanting the fovea beneath, the anterior tibiæ with a broader ear-shaped lobe at the middle. Less elongate than the Rhodesian *H. platycerus*, ♂ (No. 35), the head not so rugose, the antennæ shorter and broadly lamellate from the base, the legs and antennæ partly testaceous.

24. *Hapalochrus testaceicornis.*

? *Hapalochrus testaceicornis*, Pic, Mélanges exot.-entom. x. p. 15 (♂) (Oct. 1914).

♂. Antennæ shorter and less dilated than in *H. dilaticornis*, joints 6–9 transverse, 1–6 testaceous, 7–10 black; anterior trochanters produced into an acute tooth; anterior femora with a small tooth at the base; anterior tibiæ broadly dilated and excavate at the middle; anterior tarsal joints 1 and 2 thickened, 2 extending over 3; intermediate femora excavate and testaceous at the base beneath, for the rest black; intermediate tibiæ black, greatly thickened, deeply, abruptly excavate towards the apex within, and with a long, curved, basally-dilated appendage at the inner apical angle and a short tooth below the outer angle, the lower surface deeply foveate beyond the middle.

♀. Antennæ shorter and not so stout, subserrate, joints 1–3 partly or wholly testaceous, the others black; legs black.

Hab. W. AND E. CENTRAL AFRICA, Fort Sibut, Congo (*type of Pic*), Nyangwe (*Dr. Bequaert*: 29. xi. 1910: ♂, det. Pic), Amadi, Congo da Lemba, Yambata, Léopoldville, Bas-Kasaï, Mayumbé, Wombali, Coquilhatville, Manyema, &c. (*Mus. Congo Belge*: ♂ ♀), W. Ankole in Uganda (*S. A. Neave*: ♀).

The above description of the ♂ is taken from a specimen from Nyangwe named *H. testaceicornis* by Pic, but it does not agree with his diagnosis, in which he gives the antennæ as "non épaissies" and wholly testaceous in colour; a ♀, from Manyema, in the same collection was named by him *H. cribrarius*, Thoms.?, and two others, from Lac Leopold II., *H. azureus*, Er., var. These examples have the head densely rugulose, as he described.

There is a long series of this species in the Congo Museum, including a dozen males and several females, and a ♀ from Uganda in the British Museum seems to belong here.

[To be continued.]

XXIV.—*Descriptions and Records of Bees.*—LXXXIX.

By T. D. A. COCKERELL, University of Colorado.

Trigona læviceps, Smith.

Salem, S. India, April 14–16 (*G. R. Dutt*); Adderley, Nilgiris, 3000 ft., April 26 (*Dutt*); Mangalore, S. Canara, April 18–22 (*Dutt*). I also have it from Java, sent by A. Duchaussoy.

Nomada sedi, Cockerell.

In 'Entomological News,' xxx. p. 292, this was written *sedæ* by an oversight.

Habropoda fletcheri, sp. n.

♂.—Length about 13 mm., unusually slender; tongue about 9 mm.

Black, with the following parts bright lemon-yellow—scape in front, supraclypeal band (with a median upward projection), sides of face up to a little above antennæ, clypeus (which is long), labrum, and mandibles (except apex and basal tubercle); there is a narrow black band on each side of upper half of clypeus; maxillary palpi very long and slender, 6-jointed; third antennal joint dark red beneath, flagellum otherwise black, except a very faint brownish tint beneath; cheeks and pleura with long white hair; thorax above with light fulvous hair; tegulæ rufo-testaceous. Wings hyaline, faintly dusky, first r. n. meeting second t.-c. Abdomen narrow, the hind margins of the segments broadly testaceous; the surface with thin pruinose pubescence; apical segment triangular, dark; venter banded as the dorsum. Legs black basally; anterior femora with a stripe above and the apex broadly ferruginous; hind femora greatly swollen, black; tibiæ and tarsi ferruginous, hind tarsi dark, hind tibiæ broadly dark in middle, and with a large red apical lamina. The clypeus is hairy and without a keel.

Kumaon, Ramgarh, India, 6000 ft., Aug. 26, 1918 (*Fletcher*). Two males (no. 46).

Nearest to *H. magrettii*, Bingh., but less robust, with black hind femora and dark apex of abdomen.

Habropoda fulvipes, Cameron.

A male from the Khasia Hills, sent by Mr. Sladen as *H. moelleri*, is not that species, but evidently *fulvipes*. Cameron's supposed male *fulvipes* was something else, possibly not congeneric. In the male *fulvipes* the face below the antennæ is entirely rich chrome-yellow and the clypeus is carinated. The scape is yellow in front. The abdomen has the first two segments red.

Habropoda krishna, Bingham.

A specimen from the Khasia Hills (*Sladen*) bears a manuscript name by Friese, dedicating the species to Mr. Sladen. I am not aware that Friese has published it.

Habropoda hookeri, sp. n.

♀.—Length about 13 mm.

Robust, with abundant pale ochreous-tinted pubescence, not mixed with black; clypeus strongly rugose, very prominent, faintly keeled on apical half, with a transverse yellow band, broadest in middle, just before the apex; first r. n. joining second s.m. before the end.

This nearly agrees with *H. montana*, Rad., as described by Bingham, but must certainly be distinct, as the hind tibiæ are not specially broadened or modified (their spurs are ferruginous and very long), and their inner side, instead of being bare and smooth, is densely covered with brownish hair. Other salient characters are:—Labrum with a ferruginous spot on each side at base; greater part of mandibles pale yellowish or cream-colour; tegulæ pale rufo-testaceous; hair on outer side of middle and hind tibiæ yellowish white (not bright ferruginous), some black hair near base of tibiæ; hair on inner side of hind basitarsi dark chocolate; wings brownish; nervures dark fuscous (not testaceous); hind margins of abdominal segments broadly pallid; fifth segment with a pale reddish fringe.

Simla, 7000 ft., Oct. 1907 (*H. M. L.*), Fletcher, 2=type. Mussoorie, 7000 ft., Aug. 1906, also Fletcher, 2.

Dedicated to the memory of Sir Joseph Hooker.

Anthophora niveocincta, Smith.

Taru, Peshawar Dist., N.W. India, Oct. 17–21, 1914 (*Fletcher*, 4).

Anthophora cyaneotincta, sp. n.

♀.—Length about 11·5 mm.

Superficially exactly like *A. albigena*, Lep., except that the second to fourth abdominal bands are very delicately tinted with blue, though not at all shining. It also differs as follows:—Labrum distinctly larger and more quadrate; black clypeal patches not so large, leaving a dagger-shaped vertical light mark and broad-triangular lateral light areas (the lateral and supraclypeal marks do not differ, and the scape is entirely black); fifth abdominal segment entirely black-haired, except for the long white hair at extreme sides; outer side of hind basitarsi with hair all black. The face-markings are creamy white.

In Friese's table of Palæarctic species it runs to *A. albigena*, but in the labrum approaches *A. magnilabris*, Fedt.

Abbottabad, India, June 10, 1916 (*Fletcher*, 40).

Xylocopa phanerocephala, sp. n.

♂.—Length about 17·5 mm., width of abdomen 7·8 mm.

Tegument pure black, but face below level of antennæ, bright lemon-yellow; labrum black, strongly punctured, with a smooth median band; scape long, black; flagellum, ex*ıbri*-first joint, obscurely brownish beneath; eyes large, byous and orbits parallel; cheeks and occiput with pale hair, fcal tarsal thin black hair; middle of mesothorax with very sparse punctures; thorax black-haired above, but anteriorly with a broad band of pale ochreous; mesopleura with pale ochreous-tinted hair, but posteriorly to this it is black. Legs black, with black hair, but long pale hair on anterior tarsi posteriorly, and some pale hair on their tibiæ; hind femora sharply keeled beneath; hind tibiæ robust and curved; tegulæ black or nearly, not punctured. Wings strongly suffused with brown, but not opaque, beautifully violaceous iridescent. Abdomen rather narrow, not very densely punctured, bare, with short black hair, long at apex, first segment black-haired; underside of abdomen with much pale ochreous hair.

Ootacamund, India, 7500 ft., Dec. 24–31, 1913 (*Fletcher*, 1). Two specimens.

Rather like *X. collaris*, Lep., to which it runs in Bingham's table, but easily separated by the parallel orbits and other characters.

Prosopis absoluta, Cameron.

♀.—Chapra, Bengal; bred from munj-grass stems, April–May 1910 (*Mackenzie* : *Fletcher*, 10).

The markings are very pale, really cream-colour; the lunate spot which Bingham describes as being at the base of the clypeus is supraclypeal.

Tetraloniella chaprensis, sp. n.

♀.—Length about 10·5 mm., anterior wing 8 mm.

Robust, black, with the clypeus, most of labrum and of base of mandibles yellow; apical part of mandibles black, with an orange stripe; maxillary palpi five-jointed, joints measuring in μ: (2) 128, (3) 192, (4) 112, (5) 96; eyes reddish; facial quadrangle about square; hair of head pale, with an ochreous tint, brighter on occiput; scape and first two flagellar joints almost entirely black, rest of flagellum bright chestnut-red; thorax above with bright fox-red hair, dense and not very long; pleura with pale hair, becoming white beneath; tegulæ clear ferruginous. Wings strongly dusky; stigma and nervures ferruginous; second s.m. oblique, but scarcely narrowed above; first r. n. meeting second t.-c. Legs black, the tarsi ferruginous apically; hair of legs mainly pale ochreous, but dark on anterior tarsi, dark chocolate on middle and black on inner side of hind tibiæ and basitarsi; on outside of hind tibiæ and basitarsi it is stiff and white, but the tuft on hind knees is strongly reddened.

Abdomen black, the hind margins of the segments concolorous; basal half of first segment with pale ochreous hair; segments 2 and 3 with very broad, entire, felt-like basal hair-bands, so broad as to reach hind margin at extreme sides; fourth segment covered with such white hair except at sides of base narrowly, but the actual margin fringed with pale reddish; fifth and sixth with rusty-black hair.

Chapra, India (*Mackenzie*: *Fletcher*, no. 17).

Very distinct from the species known to me. Nurse has described two species of *Tetralonia* with clypeus yellow in female; the palpi have not been examined, so they may be referable to *Tetraloniella*. *T. chaprensis* differs from *T. phryne* (Nurse) by the bands on the abdomen being neither narrowed nor interrupted; and from *T. cassandra* (Nurse) by the lack of apical hair-bands on abdominal segments 2 and 3.

Tetralonia punctilabris, Cameron.

♀.—Peshawar, Khaibar Pass, Alimasjid, April 25, 1916 (*Fletcher*, 31).

This agrees with Cameron's description, except that the third abscissa of the radius is practically equal with the second, and Cameron says nothing about the hind margin of the first abdominal segment being broadly testaceous. Presumably it is the same species. It is related to *T. tricincta* (Erichs.).

Tetralonia pachysoma, n. n.

Habropoda lata, Cameron, Rec. Albany Mus. 1905, p. 200 (not *T. lata*, Provancher, 1888).

Dr. Brauns has examined Cameron's type, and finds it to be a *Tetralonia* allied to *T. braunsiana*, Friese.

Tetralonia leucopoda australior, subsp. n.

♂.—Hair on last two abdominal segments dark chocolate, instead of fawn-colour. Eyes pale green, more or less suffused with red.

Bellary District, Hampasagar, India, Aug. 31, 1912 (*Fletcher*); Ramakrishna, 20 = type. Godavari District, Annampallee, Dec. 19–22 (*T. V. R.*).

This is also very similar to *T. phryne* (Nurse) from Deesa, of which *T. glabricornis*, Cam., also collected by Nurse at Deesa, appears to be a synonym. Cameron describes *glabricornis* as having the small joints of tarsi pale testaceous and the first r. n. interstitial; in *australior* only the apical tarsal joint is red, and the first r. n. joins second s.m. an appreciable distance from its apex.

Tetralonia punjaubensis, Cameron.

♂.—Lyallpur, Punjab, July 24, 1917 (*C. R. Dutt: Fletcher*, 21).

This is evidently Cameron's species, but the hair of the thorax is rich fulvous and the wing-nervures are dusky reddish, not black. The clypeus and labrum are polished, as if oiled.

Nomia aurifrons, Smith.

I have a male from F. Smith's collection which does not agree with Bingham's description, but Bingham knew only the female. My specimen agrees with male *aurifrons* as described by Westwood, who stated that it was his MS. *N. silhetica*. It seems possible that the supposed sexes may be distinct, in which case the name *silhetica* can be used for the species before me.

Nomia albofasciata, Smith.

This was described from Java, and the Indian so-called *albofasciata* of Bingham is evidently distinct. Bingham described the female; it seems possible that it may be identical with *N. argenteobalteata*, Cam., based on the male.

Nomia andrenina, Cockerell.

Both sexes from Chapra, India (*Mackenzie: Fletcher*, 16).

The female differs from the type in being smaller, with dark reddish middle of mandibles and legs with more red, but it is the same species. The male, hitherto unknown, is similar, but has the face and front densely covered with pale ochreous tomentum, flagellum elongated and conspicuously red near base beneath, wings strongly reddened; first two abdominal segments, before the apical depression, minutely rugose-punctate; hind legs not modified, their tarsi long; hind tibiæ with a dusky suffusion on inner side, but the basitarsi clear pale yellowish red throughout.

Nomia fletcheri, sp. n.

♀.—Length about 10·5, anterior wing 8 mm.

Robust, black, with greatly enlarged tegulæ, which are white, with a large brown patch; head broad and thick; tongue dagger-like; mandibles black, faintly reddish in middle; clypeus shining, coarsely punctured, depressed in middle, the middle and base with much white hair; sides of face and front covered with spreading glittering white hair; scape long and curved, flagellum obscurely reddish near base; vertex polished, with large scattered punctures; mesothorax and scutellum polished, nearly bare, with very large irregular punctures, sparse on mesothorax; a thin band of white hair along posterior margin of mesothorax, and postscutellum and sides of prothorax (which are sharply margined) densely covered with white tomentum; posterior face of metathorax densely and coarsely punctured, the basal enclosure small, without plicæ. Wings faintly dusky, especially at apex; stigma small, dusky reddish, nervures fuscous; first r. n. meeting second t.-c.; third s.m. very long, as long as the other two combined; b. n. meeting t.-m. Legs black, the hind tibiæ and all the tarsi with much white hair, hair on inner side of hind tarsi very pale yellowish. Abdomen shining, the first two segments coarsely punctured, unusually large punctures at sides of first before the apical depression; bases of second and following segments with bands of white tomentum; apical margins of segments (very narrowly on first) testaceous, on third and fourth overlapped by a thin fringe of hair; apex of fifth segment with dense white hair.

Tarnab, Peshawar District, India, May 1916 (*Fletcher*, 37).

Apparently allied to *N. basalis*, Smith, but much larger and with dark legs.

Nomia opacula, sp. n.

♀.—Length about 9 mm.

Black; like *N. fletcheri* in the form of the head, the tegulæ (but the dark area larger), the hair on thorax, abdomen and legs, and the dagger-shaped tongue; clypeus shining, coarsely punctured, only very thinly hairy; white hair at sides of face and front, but not very abundant; front coarsely punctured, but vertex almost entirely impunctate; scape long, flagellum faintly reddish beneath; sides of prothorax expanded and sharp-edged as in *fletcheri*; mesothorax and scutellum dull, with a very few scattered punctures; base of metathorax polished, without sculpture, posterior face dullish; mesopleura rugose. Wings strongly dusky, stigma reddish brown, nervures fuscous; b. n. strongly bent, meeting t.-m.; first r. n. meeting second t.-c.; third s.m. not so long as in *fletcheri*. Legs black, with pale hair. First two abdominal segments dull and impunctate; bands of white tomentum at bases of second and third segments, disc of fourth covered with white hair, except a median transverse band, fifth with much white hair.

Nasik, India (*Comber*).

Sent by Mr. Meade-Waldo as *N. virgata*, Ckll., which it only superficially resembles.

Nomia chaprensis, sp. n.

♀.—Length about 7·3 mm.

Robust; head, thorax, and legs black; abdomen polished, clear ferruginous, with a black band on middle third of second segment, just before the depression, third and fourth segments with entire black bands, broadened at sides, slender in middle; fifth segment and apex black; head broad, orbits converging below; mandibles red in middle; clypeus finely rugoso-punctate, supraclypeal area shining; face and front covered with pale slightly ochreous-tinted hair; flagellum dark reddish beneath; mesothorax and scutellum shining, with very fine punctures; thorax above with rather dense short pale ochreous hair; prothorax ordinary; posterior face of metathorax polished, rounded, with weak punctures; basal area small and not evidently sculptured, but there is a linear transverse groove in which are fine rugæ; tegulæ small, fulvous. Wings hyaline, stigma and nervures pale ferruginous; b. n. falling short of t.-m.; second s.m. narrow, receiving first r. n. beyond middle. Legs with pale ochreous hair, hind basitarsi broad, small joints of tarsi red. Abdomen without hair-bands, but fourth and fifth segments apically with thin yellowish hair.

Chapra (*Mackenzie*: *Fletcher*, 3).

I do not know any closely allied species. The short, broad, bare, red abdomen is distinctive.

Nomia chalcea, sp. n.

♀.—Length about 9 mm.

With the aspect of an *Andrena*; head, thorax, and legs black, tarsi reddish apically; abdomen with first segment red, second red with a broad black band, third black with extreme base and broad apex red, remaining segments black, the hind margin of fourth pellucid; mandibles dark reddish beyond middle; clypeus dullish, very finely rugose, conspicuously depressed in middle; face with very thin whitish hair; front extremely minutely punctured; scape long, flagellum red beneath except basally, broadly so at apex; mesothorax and scutellum shining, with hardly noticeable minute punctures; thorax above sparsely hairy, except the tomentose postscutellum; prothorax ordinary; sides of thorax hoary with pale hair; posterior face of metathorax rounded, shining, hardly sculptured, basal area smooth and polished. Legs slender, with glittering pale hair, ferruginous on inner side of tarsi; hind tibiæ with hardly any scopa; tegulæ ordinary, testaceous, with broadly fuscous base. Wings strongly brownish; stigma large and piceous, nervures sepia; b. n. meeting t.-m.; second s.m. narrow and small, receiving first r. n. in middle. Abdomen shining, without distinct punctures and without hair-bands; the red hind margins of first two segments broadly depressed.

Manantoddy, Wynad, India, 2500 ft., Nov. 17, 1917 (*T. R. N.*: *Fletcher*, 33).

Nomia immsi, sp. n.

♀.—Length 6·3 mm.

Head and thorax black, with rather abundant white hair, not, however, hiding surface of mesothorax; legs dark rufo-piceous, with much white hair, the hind tibiæ with a broad scopa; hind knee-plate large and conspicuous; abdomen broad, shining, first segment clear ferruginous with a pair of dusky spots, remaining segments black, with hind margins of 2 to 4 broadly testaceous hyaline; no distinct hair-bands. Mandibles red in middle; head broad, sides of face and front with much white hair; clypeus finely punctured, glittering between the punctures, not depressed in middle; supraclypeal area very large, convex, polished, with sparse distinct punctures; flagellum reddened beneath beyond middle; vertex closely punctured; mesothorax and scutellum shining, with sparse fine punctures; metathorax rounded, the basal area smooth and polished; tegulæ small, testaceous. Wings clear hyaline, stigma rufo-piceous, nervures pale brown; b. n. regularly arched, falling short of t.-m.; second s.m. very narrow, receiving first r. n. in middle; third s.m. very broad above. Abdomen not distinctly punctured.

Dehra Dun, India, 1. 5. 1912 (*A. D. Imms*: *Fletcher*, 39).

Nomia burmica, sp. n.

♂.—Length 7·3 mm.

Black, with the extreme apex of abdomen, the knees, tibiæ, and tarsi ferruginous; legs slender and unmodified; tegulæ ferruginous, not enlarged. Head broad, eyes black, converging below; mandibles rufous beyond middle; face and front densely covered with glittering pale golden hair; antennæ very long, flagellum ferruginous beneath; front and vertex dull and granular; mesothorax and scutellum densely covered with felt-like brownish-ochreous tomentum; area of metathorax rather large, dull, finely rugoso-plicate basally; truncation below area with ochreous hair. Wings flavescent hyaline, the apex dusky; stigma large, ferruginous, nervures fuscous; b. n. falling short of t.-m.; second s.m. about square, receiving first r. n. at middle; third s.m. broad above. Abdomen very finely punctured, the depressed testaceous apical margins of segments covered with pale ochreous tomentum; fifth ventral segment emarginate and with a pair of tubercles.

Tatkon, Upper Burma, Sept. 6–7, 1914 (*Fletcher*, 45).

Nomia perconcinna, sp. n.

♀.—Length about 8·2, anterior wing 6·5 mm.

Black, robust, with the hind margins of the first four abdominal segments having white tegumentary bands, very narrow on first, broadest on fourth; tegulæ ordinary, reddish fuscous; postscutellum unarmed. Head broad, sides of face and front with white hair; mandibles black; clypeus dull, finely rugoso-punctate, slightly depressed in middle; front dull; scape long, flagellum bright ferruginous beneath; mesothorax and scutellum shining, the mesothorax closely and finely punctured, the scutellum polished, with large punctures at sides and middle; posterior face of metathorax truncate, margined, finely rugulose, with very little hair; basal area opaque, without evident sculpture; mesopleura glistening, and with white hair. Legs black, with pale hair, yellowish on inner side of hind tibiæ and tarsi, the tegument of apical part of hind tibiæ red on inner side. Abdomen glistening, first segment very finely and closely punctured; apex with short dark fuscous hair, but sides of apical part with glittering silvery hair; second and third ventral segments stained with red.

Dehra Dunn, India, May 3, 1909 (*I. R.*, 88: *Fletcher*, 26).

Allied to *N. albofasciata*, Smith, and *N. argenteobalteata*, Cam., differing in pubescence and sculpture of thorax.

The following table readily separates the above new species of *Nomia*:—

	Tegulæ enlarged, with a broad white posterior lobe	1.
	Tegulæ ordinary	2.
1.	Mesothorax polished and conspicuously punctate.	*fletcheri*, Ckll.
	Mesothorax dull and hardly punctate	*opacula*, Ckll.
2.	First abdominal segment red	3.
	First abdominal segment black	5.

3.	Abdomen mainly red, stigma pale	*chaprensis*, Ckll.
	Abdomen with much black, stigma dark	4.
4.	Larger; wings dusky	*chalcea*, Ckll.
	Smaller; wings clear	*immsi*, Ckll.
5.	Abdomen with white tegumentary bands	*perconcinna*, Ckll.
	Abdomen with bands of pale ochreous tomentum.	*burmica*, Ckll.

XXV.—*Fossil Arthropods in the British Museum.*—IV.

By T. D. A. Cockerell, University of Colorado.

The insects described below were sent from Burma by Mr. R. C. J. Swinhoe, who has presented them to the British Museum. Mr. Swinhoe now writes that the amber mines are not in Burma proper, but in "what is called the unadministered tracts." The Arthropods so far described from this amber may be summarized as follows:—

Diplopoda.
- Polyxenidæ, 1.

Arachnida.
- Pseudoscorpiones, 2.
- Cheyletidæ, 1.

Insecta.
- Thysanura.
  - Lepismatidæ, 1.
- Isoptera.
  - Termitidæ, 2.
  - Embiidæ, 1.
- Dermaptera, 1.
- Corrodentia.
  - Psocidæ, 2.
- Trichoptera, 1.
- Lepidoptera.
  - Micropterygidæ, 1.
- Hymenoptera.
  - Evaniidæ, 3.
  - Bethylidæ, 4.
  - Trigonalidæ, 1.
- Homoptera.
  - Fulgoridæ, 1.
  - Aleyrodidæ, 1.
- Heteroptera.
  - Enicocephalidæ, 4.
- Diptera.
  - Mycetophilidæ, 2.
  - Cecidomyiidæ, 1.
  - Chironomidæ, 1.
  - Psychodidæ, 1.
  - Empididæ, 2.
- Coleoptera.
  - Buprestidæ, 1.
  - Elateridæ, 1.
  - Pedilidæ, 1.
  - Rhipiphoridæ, 1.
  - Dermestidæ, 1.
  - Ipidæ, 1.

Total, 40*.

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* Not a trace of an ant can be found in any of the materials. Fragments of Blattidæ occur, but not sufficient for description. There are also small spiders.

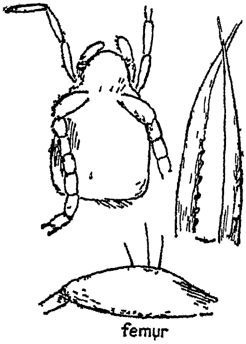
DERMAPTERA.

Labidura (?) *electrina*, sp. n. (Fig. 1.)

Length about 4·5 mm.

Fuscous; antennæ rather stout, much as in *Labia*; anterior lobe of head prominent, the whole head formed much as in *Labidura nepalensis*, Burr; last two joints of labial palpi stout, the last with short hairs and extending beyond head; last three joints of maxillary palpi long and slender, subequal, the two apical ones distad of the front of the head; hind femora stout, the upper margin strongly elevated, and with three strong dark bristles about the middle; forceps slender, denticulate on inner border, practically as in female *Labidura bengalensis*, Dohrn, but apex not curved.

Fig. 1.



Labidura electrina, sp. n.

Burmese amber, from Mr. R. C. J. Swinhoe. In a small pale-coloured piece.

The shape of the forceps recalls the American Miocene genus *Labiduromma*, Scudder. This may be immature, and very likely should be separated from *Labidura*, but it is impossible at present to find satisfactory characters on which to base a genus.

DIPTERA.

EOPHLEBOTOMUS, gen. nov. (Psychodidæ).

Minute flies closely resembling *Phlebotomus*, Rondani, but with venation approaching closely that of the Ptychopterid *Macrochile*, Loew, from Baltic amber. Antennæ very long and slender, apparently 15- (perhaps 16-) jointed, the joints with whorls of hairs, the apical joints elongate-conical, with a rounded swollen base; proboscis evident, similar to that of *Phlebotomus*; palpi long and slender, extending beyond proboscis, simple, not covered with hair, the last two joints subequal, and shorter than the one before ; thorax much less elevated than in *Phlebotomus papatasii*, Scopoli (specimen from Egypt compared), but with long erect dorsal hair as in *Phlebotomus* ; coxæ very long, longer than in *Phlebotomus*; hind femora very long and slender ; abdominal segments dorsally with long erect hair as in *Phlebotomus*; male genitalia, so far as visible, similar in general character to those of *Phlebotomus*, but these also, in respect to the claspers, are very like those of *Macrochile*. Wing much more like that of a Tipulid in general appearance than a Psychodid ; costa with long hair, but the veins not evidently hairy. The subcosta, radius, and radial sector are not strikingly different from *Phlebotomus*, but the sector arises sharply from R_1, forming a very large angle, and strongly curving near the base, rather exaggerating the condition in *Macrochile*. The anterior cross-vein is only a short distance before the fork of the radial sector ; in *Phlebotomus* it is far before it, but in *Macrochile* a short distance beyond it. M_1 (marked R_5 in Needham's figure of *Macrochile*) is unbranched. M_2 (M_1 of Needham) is also apparently simple, though it is branched in *Phlebotomus* and *Macrochile*. M_3 and Cu_1, instead of being held together by a short cross-vein as in *Macrochile*, are completely united for a considerable distance. The anal is simple.

Type the following:—

Eophlebotomus connectens, sp. n. (Fig. 2.)

Length about 1·12 mm.

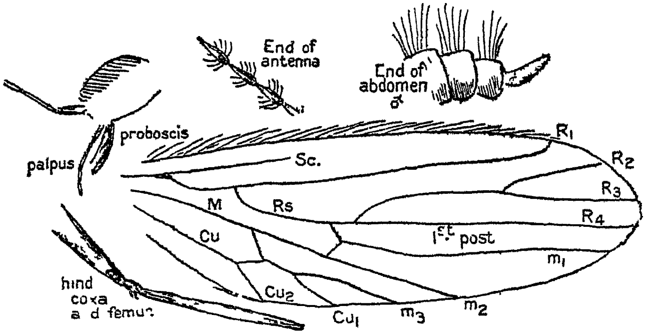
Dark fuscous, with clear wings, the venation pale. Antennæ about 720 μ long ; proboscis about 145 μ ; hind coxæ about 192 μ; hind femora about 400 μ long.

Burmese amber, from Mr. R. C. J. Swinhoe. In a small piece of pale-coloured amber.

This remarkable insect beautifully connects the Ptychopteridæ with the Psychodidæ, and indicates how the Psychodids evolved from Tipuloid ancestors. Yet in the minute size and general appearance it is entirely like *Phlebotomus* and very unlike the Ptychopterids. I am not quite sure that

M_2 is simple; it is very faint, and the edge of the wing is folded over at the point where a branch might be.

Fig. 2.



Eophlebotomus connectens, sp. n.

XXVI.—*The British Species of the Copepod Genus* Nitocra, *Boeck*. By Robert Gurney, M.A.

The species of the genus *Nitocra*, hitherto recorded as British, are—*N. hibernica* (Brady), *N. palustris* (Brady), *N. palustris*, var. *elongata*, Scott, *N. simplex*, Schmeil[*], *N. oligochæta*, Giesb., and *N.* (*Ameira*) *amphibia*, Brady. Of these *N. hibernica* is a purely fresh-water species, quite distinct from the rest, and *N. simplex* is also undoubtedly a distinct species; but, concerning the remaining species, there is some confusion as regards their validity and relationship to one another. Prof. Sars, in his 'Crustacea of Norway,' has treated *N. palustris*, *N. oligochæta*, and *Ameira amphibia* as synonyms of *N. typica*, Boeck, while he regards *N. palustris*, var. *elongata*, Scott, as identical with *N. spinipes*, Boeck. With regard to *N. oligochæta* and *A. amphibia*, he is unquestionably right, but some uncertainty remains about *N. palustris* (Brady). Having recently met with the species attributed by Prof. Sars to *N. spinipes*, Boeck, I was led to re-examine specimens which I had previously referred to *N. palustris*, and found that, in all cases, these specimens were properly to be referred to *N. spinipes*. This species is identical in all respects with Brady's *N. palustris*, with the exception that Brady describes the fifth foot of the male of that species as "obsolete, being reduced to a minute setiferous lobe," so that it was evident, either that *N. palustris* is synonymous with *N. spinipes*, and not with *N. typica*, as Prof. Sars states, or that it is a species distinct from both.

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[*] Ann. & Mag. Nat. Hist. (9) v. p. 356 (1920).

Through the kindness of Dr. Calman, I have been allowed to examine all the specimens of the genus in the Norman Collection in the British Museum. This collection contains specimens (named as *N. palustris*) from seven localities, and in all cases the females were found to be indistinguishable from *N. spinipes*. In four cases only were males present, but these males also agree exactly with those of *N. spinipes*, so that all the specimens in the Norman Collection may be regarded as belonging to that species. Prof. Meek has been good enough to send me a slide containing specimens collected by Prof. Brady at Oulton Broad, Suffolk, and named by him *Canthocamptus palustris*, and, as this is one of the original localities given by him, the specimens may be regarded as co-types. Unfortunately no males were found upon the slide, but the females agree in all respects with *N. spinipes*. The Norman Collection includes examples from Seaton Carew, Durham, which were probably named by Dr. Brady, and among these were one or two males having the fifth foot as in *N. spinipes*, so that there can be no doubt that *N. palustris* (Brady) is not a distinct species, but is synonymous with *N. spinipes*, Boeck, as described by Prof. Sars. Van Douwe * figures the fifth foot of *N. palustris* as a broad plate with four setæ, but, as he does not appear to have met with the male himself † probably his figure is taken from Dr. Brady's, which, in my opinion, represents the basal part only, the distal joint having been overlooked.

The following synonymy and short description will suffice to discriminate the British species of *Nitocra* :—

1. *Nitocra hibernica* (Brady).

Canthocamptus hibernicus, Brady, Mon. British Copepoda, xi. 1880, p. 52.
Nitocra hibernica, Schmeil, Deutsch. Freil. Cop. 1893, p. 78.

Abdominal segments with rings of spines complete dorsally. Dorsal surface marked with very fine cilia. Furcal rami longer than wide.

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* 'Deutschlands Susswasserfauna,' Heft xi. 1909, p. 57.

† Zool. Anz. xxix. 1905, p. 519.

First legs: first joint of endopodite as long as the whole exopodite, the last two joints very small.

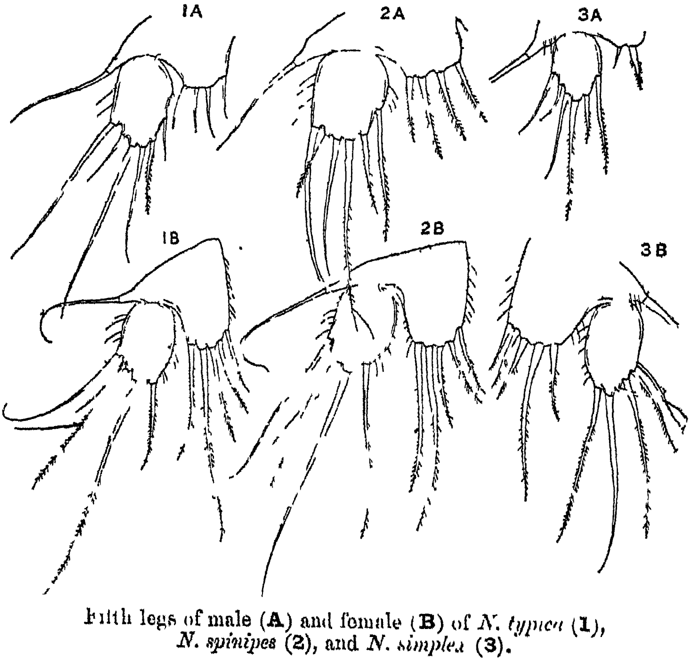
Second and third legs: no inner seta on third joint of exopodite, no seta on basal joint of endopodite.

Fifth legs of female: basal joint with two setæ and three modified spines; second joint narrow, with six setæ.

Habitat. Fresh water.

Distribution. Germany, France, South Russia. In England only in South and East, and in Ireland. Common in Norfolk Broads.

Fig. 1.



Fifth legs of male (**A**) and female (**B**) of *N. typica* (**1**), *N. spinipes* (**2**), and *N. simplex* (**3**).

2. *Nitocra spinipes*, Boeck. (Fig. 1, 2; fig. 2, B.)

Nitocra spinipes, Boeck, Forh. i. vid. Selsk. Christ. 1865, p. 274; Sars, Crustacea of Norway, v. 1911, p. 213.

Canthocamptus palustris, Brady, Monog. 1880, p. 53.

Canthocamptus palustris, Van Douwe, Zool. Anz. xxix. 1905, p. 519.

Canthocamptus palustris, var. *elongata*, T. & A. Scott, Ann. & Mag. Nat. Hist. (6) xiv. 1895, p. 459.

Rings of spines on abdominal segments not complete dorsally. In the male there is a transverse row of spines at the base of the operculum. Furcal rami broader than long.

First leg: endopodite slightly longer than exopodite, its first joint exceeding the first two joints of the exopodite.

Second and third legs: inner seta of third jotnt of exopodite present.

Fifth leg of female: basal joint with five setæ. Second joint oval, with five setæ. In the male the basal joint has three or four setæ, and the second joint has six setæ and is broader than in the female.

Habitat. Brackish water.

Distribution. Norway; Novaya Zemlya; Baltic coast of Germany; Syria. In Britain—Shetland islands; West Loch Tarbert; Unst; Langbank; Dumbarton; Bay of Nigg; Hengistbury Head. In Norfolk—Oulton Broad; Breydon Water; Horsey; Lower reaches of River Bure; Salthouse.

3. *Nitocra typica*, Boeck. (Fig. 1, 1; fig. 2, A.)

Nitocra typica, Boeck, ibid. p. 274 (1865); Sars, Crust. of Norway, v. p. 212.
Ameira amphibia, Brady, Nat. Hist. Trans. Northd. xiv. 1902, p. 57.
Nitocra oligochæta, Giesbrecht, 4th Ber. Comm. Wiss. Unt. deutsch. Meeres, 1882, p. 116.

Rings of spines on abdominal segments incomplete dorsally or broken by a series of exceedingly fine cilia. Lateral spines very long. Furcal rami broader than long.

First leg: first joint of endopodite considerably longer than the whole exopodite.

Second and third legs: inner seta of third joint of exopodite and seta of basal joint of endopodite present.

Fifth leg: ♀—basal joint with five setæ, 2nd joint oval, broad, with six setæ. ♂—basal joint with four setæ, 2nd joint with six.

Habitat. Marine (muddy shores) or brackish water.

Distribution. Norwegian Coast; Kiel Bay. In Britain—Salcombe; Southport; Scilly Islands; Newcastle, Co. Down; Salthouse (Norfolk).

4. *Nitocra simplex*, Schmeil. (Fig. 1, 3; fig. 2, C.)

Nitocra simplex, Schmeil, Zeits. Naturw. lxvii. 1894, p. 347.
Nitocra mülleri, Van Douwe, Zool. Anz. xxviii. 1905, p. 434.

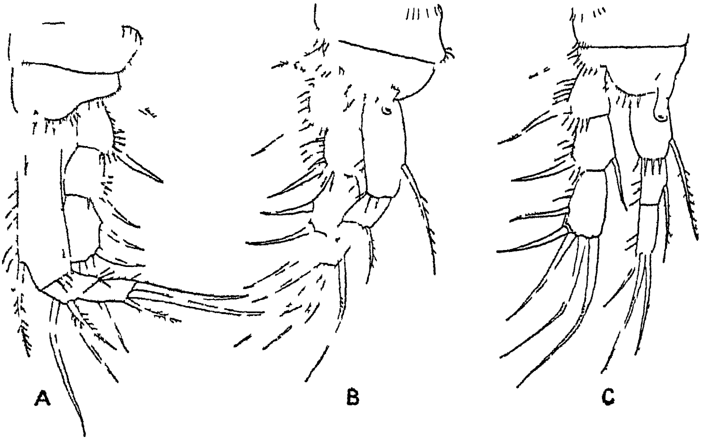
Rings of spines on abdominal segments incomplete dorsally.

First leg: endopodite and exopodite of about the same length.

Second and third legs: inner seta of third joint of exopodite present. No seta on basal joint of endopodite.

Fifth leg of female: basal joint with five setæ, second joint with six setæ, rather narrower than in *N. spinipes.*

Fig. 2.



A. *N. typica.* First leg of female.
B *N. spinipes.* First leg of male
C. *N. simplex.* First leg of male.

First antenna of male: penultimate joint with a row of knobs.

Habitat. Slightly brackish water.

Distribution. Germany (Baltic Coast). Norfolk—Hickling Broad and a ditch at Cley-by-Sea.

The genus includes also the following species:—

(1) *Nitocra pusilla*, Sars.

Nitocra pusilla, Sars, Crust. of Norway, v. p. 396.

Differs from all other species in absence of spines from the operculum and last segment of the abdomen. In this and other respects it approaches the genus *Ameira.*

Habitat. Marine. Norwegian Coast.

(2) *Nitocra woltereckí*, Brehm.

Nitocra woltereckí, Brehm, Zool. Anz. xxxiv. 1909, p. 421.

First leg: rami of equal length.

Fifth leg of female: basal joint with five setæ, 2nd joint narrow, with five setæ.

Habitat. Brackish water. Phlegræan Plain, Italy.

(3) *Nitocra fragilis*, Sars.

Nitocra fragilis, Sars, Zool. Jahrb. (Syst.) xxi. 1905, p. 386.

Closely resembling *N. spinipes*. Differs from it in shape of fifth leg.

Habitat. Brackish water. Chatham Islands.

(4) *Nitocra platypus*, Daday.

Nitocra platypus, Daday, Zool. Jahrb. (Syst.) xxiv. 1906, p. 192.

Spine-rings of abdominal segments complete in last three segments in ♂, incomplete dorsally in ♀.

First leg: rami of equal size.

Fifth leg: ♀—basal joint with one long seta and four very small ones, 2nd joint small, with five short setæ. ♂—basal joint with three very short spines, 2nd joint with five short setæ.

Habitat. Fresh water (?). Siam.

The following species which have been ascribed to the genus *Nitocra* should, in my opinion, be referred to other genera:—

(1) *Nitocra paradoxa*, Daday.

Nitocra paradoxa, Daday, Zool. Jahrb. (Syst.) xix. 1904, p. 492 (Turkestan).

The possession of two egg-sacs, the structure of the mandible-palp, and the absence of denticles on the operculum, together with the arrangement of the setæ of the swimming-legs bring this species within the definition of the genus *Schizopera*, Sars, eight species of which have been described by Prof. Sars from Lake Tanganyika, while he notes the occurrence of species also in the Chatham Islands, Caspian Sea, and in Birket-el-Kurun, Egypt.

(2) *Nitocra phlegræa*, Brehn.

Nitocra phlegræa, Brehm, Zool. Anz. xxxiv. 1909, p. 422 (Italy).

Brehm's description is somewhat incomplete, but the extreme elongation of the endopodite of the first leg and the form of the sensory spine at the base of this leg in the ♂ agree more with the genus *Ameira* than with *Nitocra*.

(3) *Nitocra brevisetosa*, Daday.

Nitocra brevisetosa, Daday, Termes. Fuz. xxxiv. 1901, p. 37 (New Guinea).

The two-jointed endopodite of the fourth leg and the structure of the antenna and fifth feet exclude this species from the genus *Nitocra.* It should be included in the genus *Canthocamptus.*

(4) *Nitocra gracilimana*, Giesbrecht.

Nitocra gracilimana, Giesbrecht, Res. Voyage du Belgica, 1902.

The smooth anal operculum, slenderness of first leg, form of the sensory spine of the male first leg, and the structure of the fifth feet indicate the genus *Ameira.*

Key for Discrimination of the European Species of Nitocra.

1. First leg: first joint of endopodite as long as, or longer than, exopodite	2.
This joint shorter than the exopodite	4.
2. Anal operculum smooth	*N. pusilla*, Sars.
Anal operculum with spines..............	3.
3. Furcal rami longer than wide	*N. hibernica* (Brady).
Furcal rami wider than long	*N. typica*, Boeck.
4. Distal joint of fifth leg of female with six setæ	*N. simplex*, Schmeil.
This joint with five setæ	5.
5. Furcal rami as wide as long. Distal joint of fifth foot of female narrow	*N. woltereckí*, Brehm.
Furcal rami wider than long. Distal joint of fifth leg of female broad	*N. spinipes*, Boeck.

XXVII.—*The 'Challenger' Eryonidea (Crustacea).* By OSCAR SUND, Cand. Real., Scientific Adviser to the Norwegian Bureau of Fisheries, Bergen.

DURING a recent stay in London I had, through the kindness of Dr. W. T. Calman, an opportunity of making the 'Challenger' collection of Eryonidea the object of a cursory examination. The following lines are a brief account of the chief conclusions arrived at.

Eryoneicus cæcus, Bate.

The single (type) specimen is 12 mm. long (carapace 6·5 mm.), and seems to have been in a rather poor condition when preserved. Still it is possible to see that the description given by Bate and Willemoes-Suhm is incomplete and the drawings, especially that by Bate (pl. xii. E), not very accurate. From the arrangement of the median dorsal spines of the carapace, it appears with little doubt that *Eryonicus faxoni*, Bouvier (Bull. Mus. Oc. Monaco, 1905), is a synonym, and that therefore *E. cæcus* is a young stage of *Stereomastis* (*Polycheles*) *sculpta*, Smith. If a single spine is designated with 1, a double with 2, and a blunt-tipped with 3, the arrangement alluded to may be represented thus:—2 (the very small rostral spines) —1—2—3 (cerv. sulcus) —2—2—3—2. I could not detect the single spine occupying the fourth place in *E. faxoni*, but that may be due to the bad state of preservation making the investigation very difficult. Along the lateral edge is found a row of eight long spines, on the branchial area a row of five, on the gastral area two, and on the branching point of the cervical sulcus one.

Willemoesia leptodactyla, Willemoes-Suhm.

Bate enumerates (p. 164) four specimens from the 'Challenger' referred to this species, but on p. 169 he mentions five. The collection contains six, some particulars of which are given in the table below, as Bate's statements partly are inaccurate, partly wrong. Measurements given in per cent. of carapace length, if not expressly stated as mm.

'Challenger' Stat. no. . .	13	133	298		300	
Locality.	21° 38′ N. 44° 39′ W.	35° 41′ S. 20° 55′ W.	34° 7′ S. 73° 56′ W.		33° 42′ S. 78° 18′ W.	
Specimen no.	1	2	3	4	5	6
Sex.	♀.	♀.	♀ (egg).	♀.	♂.	♂.
Length of carapace (C), mm.	49	38	54	46	46	33
Total length (L), mm. . .	(107)	81	120	105	110	77
Do. in per cent. of C . .	217	213	222	227	238	233
Breadth (where cervical crosses median line) . .	65	68	67	67	76	67
Breadth between antero-lateral points of carapace	(35)	42	43	43	41	46
Distance from cervical to posterior edge of carapace	47	50	50	49	49	49
Cheliped:						
Merus.	106	100	98	96	93	. .
Carpus	82	68	78	74	70	. .
Propodus	88	82	83	80	91	. .
Dactylus	47	50	46	46	50	. .

The following additional particulars are of interest in describing the specimens :—

Specimen no. 1.—This is the type of the species, and is figured in pl. xviii. and pl. xix. C'', but rather inaccurately as far as the spines are concerned at least. The armature of the median ridge may be expressed by the following formula, employing the same symbols as above, under *Eryoneicus cœcus* :—

1 1 1 1 1 2 1 1 *C* 2 1 1 1 1.

The lateral edge carries 29 spines, of which 7 are situated forward of, 4 between, and 18 behind the branches of the cervical sulcus (7+4+18). The surface of the carapace is covered by a dense "fur" of short spinules except on the elevated ridges, which are smooth. The hook in the middle line on the back of the first pleosomite is quite rudimentary.

Specimen no. 2.—Median ridge spine-formula:

1 1 1 1 1 1 2 1' *C* 1' 1 1 1.

Lateral edge spine-formula:

Right side 11+6+21, left 10+6+19.

This specimen furthermore differs from no. 1 in the following particulars :—

(*a*) Two of the median spines (marked ' in the above formula) are elastic and bend when pressed, in these respects resembling the blunt-tipped spines found in the corresponding place in all *Eryoneicus*.

(*b*) The frontal edge has nearly no orbital sinus, a feature which is well-marked in the type-specimen.

(*c*) The third joint of the antennular peduncles is only half as long as the second, in no. 1 the three joints are of about the same length.

(*d*) The last joint of the antennal peduncle is about 50 % longer than the penultimate, in no. 1 it is of equal length.

Specimen no. 3.—Median line spine-formula:

1 1 1 1 1 *C* (posterior part smooth).

Lateral edge spine-formula:

5+3+8.

Posterior portion of the edge smooth. "Fur" on carapace as in no. 1.

Specimen no. 4.—This specimen is not mentioned by Bate. Median line formula as in no. 3. Lateral edge formula:

5+3+5.

Posterior half of the edge smooth. "Fur" as in no. 1.

Specimen no. 5.—Figured by Bate in pl. xix. C. The frontal margin forms a retreating angle, at the top of which the rostral spines are situated. The carapace, when seen in profile, is strongly arched. Median line spine-formula:

1 1 1121 1 1 *C* 1 1 1111.

These spines are small. Lateral edge spine-formula:

10+5+23, well-developed spines.

The smaller spines spread over the carapace are more sparsely set than in nos. 1, 3, 4, and 6. The first pleosomite carries dorsally a well-developed hook, and the branchial ridge, which is smooth in the other specimens, carries a row of spines.

Specimen no. 6 resembles nos. 3 and 4. Median line and lateral edge-formulas as in no. 4.

The conclusion I arrived at when examining the above specimens is that they ought to be conceived as representatives of *four* instead of one species, and I accordingly propose the following names:—

1. *Willemoesia leptodactyla*, Willemoes-Suhm, represented by the type-specimen no. 1.
2. —— *secunda*, sp. n., represented by specimen no. 2.
3. —— *challengeri*, sp. n., represented by specimens nos. 3, 4, and 6.
4. —— *pacifica*, sp. n., represented by specimen no. 5.

Stereomastis suhmi, Bate.

Bate's figure (pl. xv. fig. 3) is not very good, the form of the body being, in fact, not very different from *S. nana*, *S. sculpta*, etc.

All the nine specimens, of sizes from 31 to 45 mm., were taken at Stat. 311, and every one of them displays the same median ridge spine-formula:

2 1 1 2 2 1 *C* 2 (2) (2) 2.

Bate gives it somewhat differently, making the two intermediary, small, double spines appear as single, both in the text and in the drawing, thus precluding the possibility of referring any new finds to his species, as the genus *Stereomastis* (sensu de Man) is especially characterized by the great constancy of the arrangement of the spinous armature.

Stereomastis auriculata, Bate.

The type (holotype) is a female, 49 mm. long. Length of carapace=22, breadth 15, distance from cervical sulcus to posterior edge 9 mm. Median ridge spine-formula:

2 1 1 1 2 1 *C* 2 2 *2*.

The two hindmost spines, designated by *2*, are very large. The lateral edge is armed with 5+3+7 spines. On the gastral area is a row of four spines, on the branching point of the cervical ridge one, and on the anterior branch one spine. The branchial ridge carries eleven spines.

Polycheles helleri, Bate.

Stereomastis helleri, de Man, 'Siboga' Monogr. 39 a 2.

The type (from Stat. 218, N. of New Guinea) is figured in pl. xiv. fig. 2 and pl. xv. fig. 1. Especially the last-named figure is quite misleading. The lateral edge carries 6+3+2 spines+a number of rudimentary ones in its posterior part. There is a spine in the middle of the anterior branch of the cervical ridge not shown in the figure (xiv. 2). Total length 47, carapace 22 mm.

The other specimen (from Stat. 170, near Kermadec Islands, N. of New Zealand) is certainly of a species distinct from the type. The median ridge carries the same sequence of large spines, but the spaces between these are occupied by numerous small spinules set in single row. Along the lateral edge are found 7+4+14 well-developed spines. On the cervical ridge no spines are found. Total length 32, length of carapace 16, breadth 10·5 mm.

As the specimen from Stat. 170 seems to differ fundamentally from all other species described in several of the characters mentioned above, it has a claim to a name of its own, and I take the liberty of proposing for it the name

Stereomastis kermadecensis, sp. n.

Pentacheles gracilis, Bate.

Polycheles gracilis, de Man, *l. c.*

The single specimen (from Stat. 174, 19° 8′ S., 178° 20′ E.)

is a female 52 mm. long, carapace=25 mm., breadth 19·5 and distance from cervical sulcus to posterior edge of carapace 12 mm. The median spine-formula may be given thus:

2 1 1 1 1 1 1· : . . . . *C* . . . .,

the spines in the posterior part being mere tubercles. The lateral edge is armed with 9+4+14 spines. The branchial ridge carries 30–32 small spines. There are no spines on the gastral area and none on the cervical ridges. The figure given by Bate is not particularly good.

Pentacheles lævis, Bate.

Polycheles lævis, de Man, *l. c.*

Two specimens are referred to this species. There is not much evidence apart from the labels that they are the objects referred to in Bate's text and figures.

Station	214	300
Locality	4° 33′ N., 127° 6 E.	33° 42′ S., 78° 18′ W.
Specimen	No. 1 (type).	No. 2 (cotype).
Length of carapace	18 mm.	20 mm.
Total length	37	42
Do. in per cent. of carapace	205	210
Breadth in do.	74	70
Distance from cervical to posterior edge of carapace in do.	46	46

Median ridge-formula of no. 1:

2 : : : : : : 1 : : : : 2 : : : : : 1 : : : : *C* : : : : : : 2 : : : : : : : : : ,

do. of no. 2:

2 : : : : : : : : : : : : 2 : : : : 1 : : : : : *C* : : : : : : : 1 : : : : 2 : : 2 : : : : : : : : .

Lateral edge-spines:

No. 1: 8+3+14, no. 2: 8+3+9

Bate gives the total length as "38 mm. (1·5 in.)" and "47 mm. (1·75 in.)" respectively, and states that the dorsal surface is unarmed save for the two rostral teeth and the two single spines between these and the cervical sulcus. As will be seen from the above formulas, the median ridge is in both specimens armed in a way similar to *P. debilis*, Smith, and *P. armatus*, Bouvier, and between the more prominent spines the ridge is all along armed with a double row of small tubercles (designated by a series of : : : : : in the formulæ above).

Otherwise there are a number of well-marked differences between the two specimens. The “fur” on the carapace is much denser in the cotype, which also carries a definite row of spines along the branchial ridge, wanting in the type. The greatest difference is, however, found in the outline of the front, the type resembling to a certain degree the figure given by Bate (xv. 5, ♀). But in the cotype the orbits are wide and open in comparison to the narrow notches found in the type. They are angular and embrace an angle of about 90 degrees. The distance between the intra-orbital spine and the antero-lateral is about equal to the distance between the two intra-orbital spines. In the type the last-named distance is by much the greater.

On the whole, I think it scarcely justified to refer both specimens to one species; the cotype ought to be made the type of a separate species, for which I take the liberty to propose the name

Polycheles chilensis, sp. n.

Pentacheles euthrix, Willemoes-Suhm.

Polycheles euthrix, de Man, *l. c.*

Four specimens are mentioned in Bate's text. Only two are preserved to this day, one from Stat. 170 and one from Stat. 173. They agree quite well also in matter of median ridge-armature, which, however, is wrongly represented both in the text and in the figures. It may be given thus:—

2 : ; . 1 . . . 1 . . 2 : : : 1 : : : : : *C* 2 : 2.

The lateral edge is armed with 9+4+13 spines. The gastral area carries only one spine, and there are no spines on the branchial region.

Polycheles baccata, Bate.

The six specimens, all taken at Stat. 173, were of the following sizes:—

No.	Total length in mm.	Length of carapace in mm.	Length in °/ of carapace.	Sex.
1..	68	29	2·35	Male.
2..	50	22	227	„
3..	43	19	227	„
4..	72	30	240	Female.
5..	41	18	227	„
6..	41	18	227	„

XXVIII.—*On the Genus* Trichodrilus, *and on a British Species of the Genus.* By FRANK E. BEDDARD, D.Sc., F.R.S.

THROUGH the kindness of Sir S. F. Harmer, K.B.E., F.R.S., I received in the middle of March a number of specimens of an Oligochætous Annelid in a living and quite active condition. These were sent to Sir S. F. Harmer by Mr. Charles Candler; and that gentleman had received them from the Rev. B. Barton, in a well in whose garden they occurred "in enormous numbers." The locality whence they were obtained is Pulham St. Mary, Norfolk.

The general aspect of these worms was that of a Tubificid, and they showed the same habit of collecting together into balls, from the mass of which the tails of the individual worms protruded and waved in the surrounding water. A more careful examination, however, showed that the species was not a Tubificid, but a Lumbriculid. Having ascertained this much, it appeared to me that I should probably find them to be identical with another Lumbriculid, found also in a well and in a neighbouring county, and also forwarded to me by Sir Sidney Harmer in the year 1908 *.

This latter worm was found in a well on the property of a gentleman resident near Cambridge.

I was able to give some account of it in a communication addressed to the Zoological Society of London, referred to below, and to show that this worm from Cambridge was undoubtedly a close ally of the species *Phreatothrix pragensis*, described a good many years ago by Prof. Vejdovsky from a well in the city of Prague †. It appeared to me, however, that the species from Cambridge should be assigned to a new species, and this conclusion is accepted by Mr. Southern ‡. There is no doubt, however, that the examples from Pulham are not referable to the genus *Phreatothrix* sensu stricto (I reserve for the present a consideration of the definition of the two genera concerned), but are clearly to be placed in the at least nearly allied genus *Trichodrilus*. This will be apparent in the ensuing description, which is based upon an examination of the living worms, as well as upon sections through the body of preserved individuals.

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* "A Note on the Occurrence of a Species of *Phreatothrix* (Vejdovsky) in England, and on some Points in its Structure," P. Z. S. 1908, p. 365.

† "Ueber *Phreatothrix*, eine neue Gattung der Limicolen (Ein Beitrag zur Brünnenfauna von Prag)," Zeitschr. wiss. Zool. Bd. xxvii. 1876, p. 541.

‡ "Contributions towards a Monograph of the British and Irish Oligochæta," Proc. R. Irish Acad. vol. xxvii. sect. B, no. 8, 1909, p. 119.

When living this species of *Trichodrilus* was remarkable for its very active movements if touched. It is a slender worm of rather under an inch to perhaps an inch and a half in length, perhaps even longer. Its diameter is only half a millimetre. The red blood-vessels are conspicuous, but the thick covering of chloragogen cells upon the intestine renders it difficult to study in the living condition under low powers of the microscope.

Certain characters can, however, be ascertained by such an examination. The colour, when the worm is seen in reflected light, is a golden yellow, from which the bright red main trunks of the vascular system stand out. Claparède mentions yellow as the colour of the only species of the genus described by him *, viz. *Trichodrilus allobrogum.* I do not think that this colour is due to pigment, but rather to a reflection of the effect of the chloragogen covering of the intestine. In any case it is very conspicuous, but disappears when the worm is viewed under the microscope with transmitted light.

The *prostomium* is long, rather more than twice the length of the first segment of the body; it is bluntly pointed. It agrees fairly well with the figure given by Claparède †. I did not find any tactile processes standing out from the surface of the prostomium, such as occur in *Phreatothrix* and are referred to by Vejdovsky and myself; but it may be that these processes had disappeared or been withdrawn when the worms had been for some time in a dish and were, perhaps, commencing to die.

The *setæ* are strictly paired, slender and delicate, with simply pointed free extremity—in fact, precisely like those of the individuals examined by Claparède. It was very rarely that I observed "soies de remplacement." I could detect no differences in character or size between dorsal and ventral setæ or between those of different segments.

Vascular System.—So far there is no reason to believe that the specimens of *Trichodrilus* sent to me from Norfolk differ from Claparède's species, *T. allobrogum*, found in Switzerland. But an inspection of the trunks of the vascular system does show differences, and those of some importance. Claparède figures branches of the dorsal vessel, of which there are five or, occasionally, six in the posterior segments of the body.

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* "Recherches Anatomiques sur les Oligochètes," Mem. Soc. Phys. et Hist. Nat. Genève, t. xvi. pt. 2 (1862).

† *Loc. cit.* pl. iii. fig. 15.

These vessels, he states, join the dorsal vessel with the ventral. Vejdovsky doubts the continuity of these transverse vessels with the ventral vessel, and regards them as probably ending blindly like the contractile appendages of *Lumbriculus* and many other Lumbriculids. I could myself see nothing of the kind in the live specimens examined by myself. It is true that the chloragogen layer upon the dorsal vessel and the gut is thick and opaque; but at least during the systole and diastole of the dorsal vessel the inflow of the blood into that vessel must have been visible were such vessels present. On the other hand, I was able to note the generally diffused red colour of the wall of the intestine, which is doubtless to be regarded as the expression of a blood-sinus round the gut. This is to be contrasted with the network of non-contractile capillaries which I found upon the wall of the gut in *Phreatothrix cantabrigiensis*, in which species also the blind appendages of the dorsal vessel were not to be seen. These species, however, are not unique among the Lumbriculidæ, by reason of the absence of these undoubtedly highly characteristic vascular appendages. Were they so, I should have asserted their absence in the worms just mentioned with greater hesitation.

In *Claparedilla asiatica* *, a genus later transferred to the older genus *Bythonomus* of Grube by the same author †, Michaelsen has gone at some length into the proof of the absence of cæcal vascular appendages of the dorsal blood-vessel, and has convinced himself that they are actually absent. With less certainty, perhaps, Michaelsen has also come to the conclusion that while some species of his genus *Lamprodrilus* have these appendages others have them not ‡. That I myself was not able to detect them in transverse or longitudinal sections of preserved examples of *Trichodrilus* would of itself be dangerous evidence perhaps; I dwell rather upon their invisibility in the living worm with contracting dorsal vessel. I have not myself examined these vessels in any Lumbriculid, where they undoubtedly occur, by the section method §. But Michaelsen records a good many such observations, and is thus able to speak more positively upon their absence in others. In both *Stylodrilus* and *Styloscolex* there is a similar absence of blind appendages.

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* "Oligochæten der zoologischen Museen zu St. Petersburg und Kiew," Bull. Ac. Imp. Sciences St. Petersb. (5) xv. 1901, p. 181.

† "Die Oligochæten des Baikal-Sees," in Wiss. Ergebn. Zool. Exp. Baikal-See, Kiew und Berlin, 1905.

‡ *Ibid.* p. 49 for *L. pygmæus* and p. 51 for *L. isoporus* &c.

§ Except in *Sutroa* (Trans. R. Soc. Ed. 1892. p. 195); but have no note on the subject to refer to.

The *nephridia* of *Trichodrilus allobrogum* are described by Claparède; but my own observations upon this British species do not agree in many particulars with his. I rely entirely, as to this part of the anatomy of the worm, upon longitudinal sections; I was unable to make any trustworthy observations upon the living worm by reason of its opacity.

Claparède remarks—and I am in agreement with him—that the nephridia are absent in the first six segments of the worm. He found these organs in the VIIth and VIIIth segments, but asserted their absence thereafter until the XIIIth, where they again begin, and continue in following segments. There is, I think, no doubt about the fact that, as in *Phreatothrix*, according to both Vejdovsky [*] and myself [†], the pairs of nephridia are not necessarily limited to one segment. In the present species the first pair lie in VII., but extend also through VIII., IX., and a part of segment X. This was very plain in my sections, and the continuance of the tube through the septa quite clearly to be made out. I did not see the funnel, which no doubt lies in segment VI., but I found the duct leading to the external pore upon segment VII. In segment XI. I could find no nephridia at all; but in segment XII. and the following these organs were again present. I am not certain whether the difference between the species described by myself here and that of Claparède, as is to be inferred from his description, is a real one; for recently Bretcher, in an account of *Bichæta sanguinea* [‡], which species Piguet considers to be referable to the genus *Trichodrilus* [§], has mentioned that the nephridium of segment VII. traverses also segment VIII. Nor can it be considered that the extension of this nephridium settles the identity of the genera *Trichodrilus* and *Phreatothrix* (which Michaelsen would join) on account of the conditions observable in other genera of the family.

In *Stylodrilus vejdovskyi* Benham [||] describes the first pair of nephridia as extending through segments VII.–X. in precisely the same way as has been referred to above.

In *Lumbriculus variegatus* Mrazek [¶] found that a single

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[*] System. u. Morph. d. Oligoch. Taf. xi. fig. 18.

[†] Proc. Zool. Soc. *tom. cit.*

[‡] "Süd-schweitzerische Oligochæten," Rev. Suisse Zool. viii. 1900, p. 444.

[§] "Notes sur les Oligochètes," Rev. Suisse Zool. xxi. 1913, p. 141.

[||] "Notes on some Aquatic Oligochæta," Quart. J. Micr. Sci. (n. s.) xxxiii. p. 211.

[¶] "Beiträge zur Naturgeschichte von *Lumbriculus*," SB. k. Böhm. Ges. 1913.

nephridium may also occupy three segments, but considers that he is here recording an abnormality[*]. Furthermore, both Vejdovsky and Benham find in the genera *Phreatothrix* and *Stylodrilus* a similar state of affairs in the second pair of nephridia which traverse segments XIII.–XV. or (*Phreatothrix*) XIV.–XXI. I am not quite certain how far I can agree with those authors from my examination of my species of *Trichodrilus*. The nephridial tubules in segments XII. &c. undoubtedly come into very close contact at the intersegmental septa; but I should not like to allege positively that they form part of one nephridium extending through these segments.

In Vejdovsky's figure of the two first nephridia of *Phreatothrix*[†] the complex nephridia, if they are really formed by fusion of the pairs belonging to the several segments through which they pass, are represented as very simple in character; they consist of simply two tubes running side by side. This simplicity is also to be seen in *Stylodrilus*. In my species, on the other hand, the coils of the nephridium are much more numerous, and a considerable thickness of nephridial "tissue" is thus to be seen in each segment. I take it that there is here a resemblance to *Teleuscolex korotnewi* as seen by Michaelsen[‡].

As to the *reproductive organs*, none of the specimens appeared to be fully mature[§] when examined with a hand-lens. The clitellum could not be detected, and the only external sign of maturity was the whitish appearance of the two or three segments in a region just posterior to the male pores, and which seems to be due to ripe ova. I therefore did not preserve many examples for the elucidation of these organs, but studied them in the living condition for the sake of other organs, after which they were not in a very fit state for fixing and hardening. Fortunately, however, I kept three examples, in all of which the sexual organs were quite well developed, and, indeed, tending perhaps towards degeneration; for while the thirteenth, fourteenth, and fifteenth segments contained a few ripe ova and the sperm-sacs were obvious, the funnels of the sperm-ducts were, perhaps, rather reduced in size, though still plain enough for the purposes of identification as such.

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[*] Claparède had already mentioned this fact in a worm erroneously supposed to be *Lumbriculus variegatus* of Grube in his account of that worm (in Mém. Phys. Genève, *t. c.*). The genus, however, to which Claparède's observations referred is now named *Claparedilla* (to be merged in *Bythonomus*?).

[†] Syst. u. Morph. Olig. Taf. xi. fig. 18.

[‡] Bull. Ac. Imp. Sci. St. Petersb. 1901, p. 169.

[§] According to Ditlevsen (referred to later) *Trichodrilus allobrogum* is fully mature in July. This difference of season may be a valid distinction from the present species.

The numbers and position of the spermathecæ were those of *Trichodrilus* as opposed to *Phreatothrix*, for there were two distinct pairs of the spermathecæ of quite equal size in segments XI., XII., instead of two spermathecæ only—those of the anterior pair,—together with a smaller pair belonging to posterior set. But it will be remembered that in my species *Phreatothrix cantabrigiensis* there was no trace of the second (posterior) pair. Doubtless this is not a strong reason for separating the two supposed genera; but it is a reason, among others, for proving the difference between the two subterranean worms of East Anglia, which would certainly have been expected to be of the same species.

The *spermathecæ*, like those of other Lumbriculids, consist of a thin-walled sac and a thicker-walled duct. The sac has a lining composed of a single layer of cells. This is covered by a delicate peritoneal layer also one cell thick. I could detect no muscle-fibres between the two layers. The general form of the sac is oval, but varies a little. There is nothing in any way remarkable about their form. Spermatozoa, not aggregated into bundles, were to be seen lying loosely but closely in the sacs. The ducts of the organs are very narrow and fully one-third of the length of the sac or rather more, and either straight or twisted in their course to the exterior. The muscular wall of circular fibres is relatively thick. The openings are posterior in the eleventh and twelfth segments on a level with, and occupying a similar position to, the atrial pores, or very nearly so.

There are two pairs of *testes* in segments IX., X., close to the nerve-cord. They are flattened dorso-ventrally and not very wide. They extend through perhaps a length of half the segment.

The *ovaries* correspond exactly in position to the testes and lie in segment XI. They are, however, different in shape, being pear-shaped and much larger.

I have found *sperm-sacs* in one or other of the two specimens which I have investigated by longitudinal sections in segments X.–XIII. inclusive. There are also sperm-sacs in segment VIII., and, like those of *Aurantina aurantiaca* *, are attached to the wall dividing VIII./IX., and depend into segment VIII.

The *egg-sacs* are in segments XIII., XIV., XV., XVI.

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* Pierantoni, "Oligocheti del Fiume Sarno," Archiv. Zoolog. Napoli, 1905, vol. ii. fasc. 2, p. 232, tav. xiv. figs. 4, 6, *ssp.*

Whether they extend further than this I do not know. They contained large ripe ova with the usual abundant yolk.

The *sperm-ducts* are in segments IX., X., XI., and open on each side by the atrium on to the tenth segment. The funnels are in the ninth segment and the tenth, and are much as figured and described by Claparède in this, and, by him and others, in other Lumbriculids allied to *Trichodrilus*. The funnels were, as is usual, conspicuous owing to the bundle of spermatozoa caught up by the ciliated mouth of each. The main part of the posterior pair of sperm-ducts forms a coil in the eleventh segment close to the anterior wall of that segment. I did not observe the actual openings of the sperm-ducts into the atrium with absolute certainty. The funnels, instead of being flattened over the septum and plate-shaped, are cup-shaped, as Hesse (quoted below) figures in *Lumbriculus*[*].

The *atrium* is generally as recorded by Claparède[†]. It is noteworthy for the very thick circular muscle-layer figured by that author, and subsequently by Ditlevsen[‡] and Piguet[§]. Its duct to the exterior is narrow and projects as a penis into an ingrowth of the epidermis, forming a small circular cavity. This is not indicated by Claparède. As I point out later, the characters of the atrium may distinguish this genus from *Phreatothrix*. Hesse[‖], and, later, Mrazek[¶] have given figures of the atrium of *Lumbriculus*, and the first-named has compared it with that of *Claparedilla*, *Rhynchelmis*, *Stylodrilus*, and *Trichodrilus*, remarking that these forms have always glandular cells outside of the atrium, but never muscle-layers as in *Lumbriculus*. This in spite of Claparède's figure referred to by him. However, Hesse appears to be correct in his statements of the other genera mentioned in his list, admittedly taken from the writings of others[**]. It would appear, therefore, that the presence of a muscular layer is of some systematic importance in *Trichodrilus*. There is, however, undoubtedly, in the latter at least, no such thick layer of longitudinal fibres as Hesse has figured * in *Lumbriculus*. I have been unable to see any longitudinal layer at all, nor is it shown in Ditlevsen's figure; but if there be one present, it can hardly consist of more than a single layer of fibres. The figures of Hesse are borne out by those of Mrazek †.

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[*] Or perhaps they would be better described as funnel-shaped. Miss Dixon (*Tubifex*, Liv. Mar. Biol. Comm. Memoirs, xxiii., London, 1915) remarks (p. 58, *cf.* pl. iv. figs. 17, 18) that the funnels of *Tubifex* are cup-shaped in the more immature worm, and more expanded later.

[†] Mém. Soc. Phys. Genève, *t. c.* pl. iii. fig. 6. Claparède does not indicate the lining epithelium of the atrium.

[‡] "Studien an Oligochäten," Zeitschr. wiss. Zool. Bd. lxxvii. 1904, p. 141, Taf. xvii. fig. 49.

[§] Rev. Zool. Suisse, *t. c.* woodcut, p. 141.

[‖] "Die Geschlechtsorgane von *Lumbriculus variegatus*, Grube," Zeitschr. wiss. Zool. Bd. lviii. 1894, p. 355 (also published as Bd. i. no. 1 of 'Tübinger Zoologische Arbeiten').

[¶] "Die Geschlechtsverhältnisse und die Geschlechtsorgane von *Lumbriculus variegatus*, Gr.," Zool. Jahrb. Bd. xxxiii. 1906, p. 381.

[**] More lately Michaelsen has figured (Bull. Ac. St. Pétersb., Sept. 1901, pl. xi. fig. 19) a circular muscle-layer in *Rhynchelmis brachycephala*.

The *oviducts* were not seen by Claparède, who located them as probably lying in segment IX., by reason of the fact that this segment contained (as he thought) no nephridium, its place, on the older theory of the correspondence between nephridia and gonad ducts, being taken by the oviduct. As a matter of fact, the ninth segment in the species described here does contain a part of the anterior complex nephridium. The oviduct, as might be expected, opens into segment XI., and opens on to the exterior between this segment and the following one. Its outline is not that of a funnel with a very short stalk, as this organ is apt to be depicted; in longitudinal section it has the outline of a lyre, the edges above being recurved and the cavity widest some way below this edge, which is the actual funnel. The duct narrows.

The above account of this worm may be summed up as follows:—Length 25 mm. and upwards; diameter ·5 mm. or less. A thin, slender, and active worm. Prostomium conical, with no special tentacle-like prolongation at apex, in length rather greater than breadth of first segment. Colour golden-yellow. Setæ slender and simply pointed; closely paired, rarely with reserve setæ. No vascular appendages of dorsal vessel; intestine surrounded by sinus, and not network of blood-vessels. Chloragogen layer of intestine begins in VI. First pair of nephridia lie in segments VII.–X. inclusive, open on to VII. with funnel in VI.; no nephridia in XI., but occur in XII. and onwards. Nephridia forming coils several tubules wide. Testes in IX., X.; funnels of vasa deferentia in IX. and X.; atrium with thick muscular walls of circularly running fibres, lined by an epithelium of small cells and covered by large pear-shaped cells externally; narrows into a muscular duct which projects into external depression at orifice on X. Sperm-sacs in VIII.–XII., those of first pair rising from septum VIII./IX., and thus directed forwards. Ovaries in XI. Oviducts with long dilated tube opening on to XI./XII. Egg-sacs from XIII. or XIV. to third segment or more (?) from this.

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* *Loc. cit.* Taf. xxii. fig. 4.

† *Loc. cit.*, several woodcuts on pp. 431, 432, 433, 435, &c.

I term this species, if it be accepted as undescribed, *Trichodrilus icenorum*, after the plan of nomenclature initiated for the genus by Claparède.

To determine whether this subterranean species is or is not identical with *Trichodrilus allobrogum* of Claparède is very difficult on account of the incomplete description given by that naturalist. I do not find it possible to come to any conclusions as to differences in the form of the spermatheca and atria in the two forms. It would seem, however, that the vascular and excretory systems do offer differential characters.

I do not think that there is room for error in the quite diverse descriptions given above of the appendages of the dorsal vessel which were lacking in the examples of this *Trichodrilus* examined by myself, and are fully figured and described by Claparède. Furthermore, that author is detailed in his account of the nephridia of the early segments of the body, and his descriptions differ from what I have seen myself; the doubts, therefore, which I have expressed above may be unnecessary. The slender looping of the nephridia in the Swiss species seems also to be different from the closely packed and rather numerous coils which I found in the nephridia of the worm from Norfolk.

There can be, as I think, no doubt that both Bretscher* and Piguet † are right in distinguishing *Trichodrilus sanguineus* as a species different from that of Claparède. Nor can I identify it with the form described here by myself. The possession of only one pair of spermathecæ seems to be a sufficient mark of specific distinctness. Moreover, this form is a smaller one, measuring only up to 13 mm. as compared with 14–25 mm.

This leads at once to the question of the identity or non-identity of the genera *Trichodrilus* and *Phreatothrix*, for the main difference between the two genera, according to Vejdovsky ‡, is the presence of two pairs of spermathecæ in the former genus, while *Phreatothrix* has only one pair of these organs in the eleventh segment, the second pair disappearing at maturity. This latter statement does not, however, apply to the species which I found myself in water from a well at Cambridge. In this species § there was but one pair of the organs, and no trace of the smaller pair of *Phreatothrix pragensis*. Vejdovsky is doubtless correct in noting a protrusible penis in *Phreatothrix*; but is it so clear that he is right in denying one to *Trichodrilus*? It is true that Claparède, as Vejdovsky says, neither mentions nor figures such; but, though present and obviously protrusible in my *Trichodrilus icenorum*, it is not very conspicuous, and would probably be overlooked in examples studied without the aid of microscopic sections. My species, in addition to the penis, has two pairs of spermathecæ, and thus would be intermediate between the two genera. A possible difference is not referred to by Vejdovsky, and that is the thick muscular walls of the atrium figured by Claparède and the much thinner atrial walls figured by himself in *Phreatothrix*.

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* Rev. Suisse Zool. vol. viii. p. 444.

† *Loc. cit.* vol. xxi. p. 141.

‡ Zeitschr. wiss. Zool. *t. c.*

§ Proc. Zool. Soc. *t. c.*

I have no notes as to the state of affairs in *Phreatothrix cantabrigiensis*, but I have already referred to this matter above, and may here point out that Piguet* figures such an atrium in *Trichodrilus sanguineus*, which, on account of its single pair of spermathecæ "should be" a *Phreatothrix*. I am disposed to follow Michaelsen in fusing these two genera.

Note on a possibly second British Species of Trichodrilus.

A third example of *Trichodrilus*, which I examined by longitudinal sections, was not put aside by me as a probably second species of the genus; but on microscopical study it shows certain differences from those upon which the above account of *Trichodrilus icenorum* was mainly based.

As I am unable to give more than an account of the reproductive system, I hesitate—for reasons which will be explained—to refer it definitely to a second species, and therefore do not give it a name.

Inasmuch as this worm has two pairs of testes in IX., X., one pair of ovaries in XI., sperm-duct funnels in IX., X. opening into an atrium which itself opens on to the exterior in segment X., an oviduct funnel in XI. opening on to the segmental border-line XI./XII., two pairs of spermathecæ lying in XI., XII., and, finally, that it was found with others showing exactly the same characters and described above, it would seem impossible to create for it a new species.

Nevertheless, the atrium and sperm-ducts show marked differences from those of the type-specimens of *Trichodrilus icenorum*, which are as follows:—The atrium consists, as in the others, of a nearly spherical sac communicating with the exterior by a much narrower duct. It has a wall, which is, however, very much thinner than that of the others, though it is composed of precisely the same layers. It is lined by a layer of cells, around which are disposed muscular fibres running in a circular direction; the outer layer is again cellular. But the characters of these layers are totally different—at any rate, of the outermost and innermost. The middle muscular layer is simply much thinner. That there is an outer layer at all is not obvious at first sight; the pear-shaped cells, closely pressed together, of the typical *Trichodrilus* (as shown in the figures of Claparède and Ditlevsen and in my own sections) are replaced by a scanty layer of cells, whose nuclei are visible, but at some distance from each other. The cells are clearly flattened and few. So, too, with the lining epithelium of the atrium. The general aspect in fact of this organ is that of the "normal" atrium greatly dilated, and its various layers therefore flattened through pressure and extension. This may, of course, be the actual fact; but in the first place the difference of diameter may be slightly, but is not greatly, in excess of that of the examples reported upon above, and the sac is not gorged with sperm, which might have been the cause of its dilation. The sperm may, however, have escaped to the exterior or to another individual. A nearly exactly similar difference in two individuals of *Lumbriculus* is figured by Mrazek [*].

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* Rev. Zool. Suisse, *t. c.*

Be this as it may, the condition of the sperm-ducts show another kind of difference from those of the typical *Trichodrilus icenorum*. They were particularly easy to study on account of their large size, which was not the case with those of the other examples of the genus which I have described in the present communication.

The great increase of size was particularly marked in the case of the anterior pair, in the middle of the course of which the diameter of the duct was dilated to a width not very far from that of the atrial cavity. A long piece of the sperm-duct was thus increased.

This increase of size of the sperm-ducts and of the cavity of the atrium has brought it about that the entry of the former into the latter is quite clear. They enter at opposite sides—anterior and posterior—and at about the middle of the atrium. It is not a question here of the dilation of the sperm-ducts owing to pressure—at any rate, pressure which has thinned and flattened out the walls. For the cellular walls of the sperm-duct (surrounded, of course, by a flattened peritoneal layer) are actually thicker than is the case with the sperm-ducts of the individuals described above. I have noted, indeed, that in some regions the whole sperm-duct of the typical individuals was not wider than one cellular wall of the sperm-duct of the individual now under consideration.

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[*] Zool. Jahrb. xxiii. 1906, fig. F, p. 430, and fig. M, p. 440.

This fact alone does not render impossible the view that the difference shown in the individuals is really due to distention; for if the sperm-duct lumen is intercellular, it would mean simply a pushing out of the cells by their inclosed contents, and no necessary alteration in the epithelium itself. The case obviously becomes different, however, if the sperm-duct has an intracellular lumen. In the present specimen there would seem to be every probability that for some distance after the funnel the lumen is intercellular, since the nuclei in the walls of the ducts are fairly closely arranged in the walls of the tube side by side. But later on this is not the case, and I have observed transverse sections of a piece of tube with but one nucleus therein, and pieces of longitudinal section with very few nuclei. This means at least fewer and larger cells to the wall, if it does not prove an intracellular duct.

In this region it is to be noted that there is no perceptible dilation of the tube, which is therefore really larger than in the specimen described above.

I may take this opportunity of observing that the distinction between an intracellular and an intercellular duct is not perhaps of great importance; but it is, after all, an anatomical difference between the nephridia of the Oligochæta and the sperm-ducts of the great majority of those worms. It is thus worth pointing out in the present instance as a character of the genus *Trichodrilus*, for the observations which I have made upon the example which I now refer to are confirmed by a re-examination of the other specimens of the genus dealt with in the present paper. Undoubtedly intracellular sperm-ducts only occur among the "Limicoline" Oligochæta, and are not commonly met with. Benham * has given ample reasons for thinking that the sperm-ducts in his *Phreoryctes heterogyne* are of such a character. More to the immediate point are Mrazek's figures of *Lumbriculus* † where the atrial end of the sperm-duct seems to be represented in his figures as with an intracellular duct, while the region immediately succeeding the sperm-duct funnel would appear to possess an undoubtedly intercellular duct. This condition, it is to be noted, is precisely that of *Trichodrilus*.

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* "On a new Species of the Genus *Haplotaxis*, with some Remarks on the Genital Ducts in the Oligochæta," Quart. Journ. Micr. Sci. (n. s.) xlviii. 1904, p. 304.

† Zool. Jahrb. *l. c.* p. 435, figs. J 1, J 2. See especially the latter figure for the atrial part of the sperm-duct. In *Tubifex*, according to Miss Dixon (*loc. cit.* pl. iv. figs. 18 A, 19 A, B), the sperm-duct also seems to become intracellular. But Gatenby (Quart. J. Micr. Sci. (n. s.) lxi. p. 320 &c.) describes and figures the duct (pl. xxiv. fig. 17 E) as intercellular.

Although, on the above analysis, it would seem that the differences between the two sets of individuals does not affect characters of importance, it is clear to anyone examining the actual structures concerned that a line can easily be drawn between them. Such as it is, I have attempted to put the difference into words. A glance, however, at the sections themselves renders impossible any confusion between the two varieties; I may remark, without further detail, that this also applies to the spermathecæ. I cannot, however, find other reasons for dividing the British *Trichodrilus* into two species; nor, on the other hand, am I in a position to assert that such do not exist. It is just possible, but not likely, that the last-described specimen was not so carefully examined by me when alive; it *may* therefore possess, for instance, the vascular appendages of the dorsal vessel which I found wanting in all the examples which I did examine. Nor can I see any reason for explaining the differences in the sperm-duct as positively due to distention, or to immaturity or degeneration. But the fact that a similar variation occurs in the atrium of *Lumbriculus*, so nearly allied a genus, makes me unwilling to lay undue stress upon the varying sperm-duct of the present species, although I cannot recollect an analogous case *. I prefer—at any rate, for the present—to leave the matter of the specific identity or non-identity of the series of examples described here as uncertain.

XXIX.—*Three new Mammals from Northern Rhodesia.*

By MARTIN A. C. HINTON.

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THAT famous collector Captain Guy C. Shortridge was attached for some considerable time to the air-station at N'dola, in Northern Rhodesia. As was to be expected, he made very good use of his opportunity, and his large collection of mammals has now arrived in the Museum. A full account of this collection will be published later, but meanwhile it is deemed advisable to publish descriptions of the following three new species:—

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* At any rate, a strictly analogous case. It will be recollected that in *Sutroa* (Beddard, Tr. Roy. Soc. Edinb. *t. c.*) one of the two pairs of sperm-ducts has a distinctly less calibre than the second.

Mimetillus thomasi, sp. n.

Type.—An adult female, collected at N'dola on Oct. 4, 1919; original number 481.

This interesting bat, represented by a single specimen, is distinguished from its West-African relative, *M. moloneyi*, chiefly by its larger size, duller colour, and still flatter skull.

General outward appearance and all the essential characters of the genus as in *moloneyi*. Size larger, the forearm measuring 31 instead of 27–29 mm. Third digit of wing relatively a little longer, its total length equalling 165 °/₀ (instead of 146–159 °/₀) of the length of the forearm. Fur on back slightly longer. General colour, above and below, dark brown, deepening almost to black on head, dull, lacking both the gloss and the deep chestnut tinge seen in *moloneyi*.

Skull considerably larger (condyle to canine 14·1, instead of 13 mm.), with the characteristic depression and flattening of the brain-case even more pronounced than in *moloneyi*; interorbital region relatively broader. Dentition without especial peculiarities.

External measurements (taken in flesh by collector).—Head and body 56 mm.; tail 38; hind foot 7·5; ear 13.

Measurements of wing (made on skin).—Forearm 31; third digit, total length 51, its metacarpal and phalanges 1 and 2 being respectively 32·5, 9, and 9·5; fifth digit 36, its metacarpal 29·5. Revilliod's index of width 49.

Skull.—Extreme length 14·6; condyle to canine 14·1; canine to m^3 5·2; width of brain-case in mastoid region 9·5; median occipital depth 4·7; interorbital breadth 5·3; breadth across preorbital swellings 8; width across outer borders of m^3–m^3 7·8.

Mimetillus moloneyi was originally described from Lagos by Mr. Thomas. Many specimens were collected subsequently in Fernando Po; and we have lately received an example from Sierra Leone, collected by Mr. Willoughby P. Lowe. Hitherto no representative of the genus has been found inland or away from the West-African coast. Captain Shortridge's discovery in Rhodesia is therefore of considerable interest. I have great pleasure in naming the second species of this genus in honour of Mr. Oldfield Thomas, to whom I am indebted in so many ways.

Kerivoula lucia, sp. n.

Type.—An adult male collected at N'dola on Sept. 26, 1919; original number 472. No other specimen seen.

This species closely resembles *K. lanosa* in general appearance, but it is distinguished by its rather smaller size, smaller and less hairy ears, greyer colour, and by some characters of the skull.

Size small, forearm 30·5 mm. Fur on body and top of head very long, dense, and woolly, closely resembling that of *lanosa* in quality. Cheeks in front of ears nearly naked. Ears very sparingly haired on outer surface, nearly naked within. Forearm, thumb, and outer edge of dorsal surface of wing clothed with tufts of hair; upper surface of tibia, hind foot, and tail similarly clothed. Interfemoral membrane with tufts of hair along the veins on dorsal surface, similar but smaller tufts of hair on ventral surface; with a well-developed posterior fringe. Ears smaller than in *lanosa*, with a somewhat deeper, though narrower, lateral emargination towards the tip; tragus normal.

General colour of back between "sepia" and "dusky drab," passing to a light grey on top of head and muzzle. Dorsal hairs with slaty bases, mostly with long yellowish-brown tips; in many the tips are silvery, and these silver tips produce a quite conspicuous "lining" on the back and rump. Under surface silvery grey, darkened irregularly by the partly visible slaty bases of the hairs. Hairs on forearm, wings, legs, tail, and the upper surface of the interfemoral membrane yellowish; those on the ventral surface of the membrane are silver.

Skull about as large as that of *K. lanosa*, from which it is distinguished by its relatively narrower brain-case, more boldly convex frontal region, narrower rostrum, and more nearly parallel tooth-rows, the width between the outer borders of the last molars markedly less in proportion to the width across the canines. Dentition not essentially different. Outer upper incisor about three-fourths the height of inner incisor, rather stouter than the latter in cross-section, and with a well-developed internal basal cusp. Inner incisor with a posterior secondary cusp, the summit of which is a little less lofty than the outer incisor. Middle upper premolar smaller in cross-section than the anterior premolar.

Collector's measurements (taken on the flesh).—Head and body 39 mm.; tail 40; hind foot 6; ear 12.

Wing-measurements (from skin).—Forearm 30·5; third digit, total length 66, its metacarpal and phalanges 1 and 2 being respectively 32, 16, and 18; fifth digit 46·5, the metacarpal and phalanges being 30·5, 9, and 7·5.

Skull measurements (those of 7. 1. 1. 538, a cotype of *lanosa*, being added in parentheses for comparison).—Greatest length 13 (13·4); condyle to canine 11·5 (11·5); canine to *m* 5·1 (5·2); width across canines

3 (3·2); width across outer borders of m^3–m^3 5·1 (5·5); zygomatic breadth 7·7 (7·9); interorbital breadth 3 (3); width of brain-case 6·6 (7·1).

This pretty little bat is named in honour of Miss Wilson, to whom I am indebted for much intelligent assistance.

Zelotomys shortridgei, sp. n.

Type.—An adult female collected at N'dola on June 30, 1919; original number 336. Five other specimens (♂, 47, 301, 392; ♀, 48, 248) examined.

This is a pallid species, differing widely in colour from *hildegardeæ* and *instans*, the two species hitherto known, with a skull of somewhat intermediate form.

Size about as in the other species. Fur as long as in *hildegardeæ*. General colour above near buffy brown, the middle line of back not specially darkened; flanks lighter greyish or yellowish brown. Under surface dirty white, the ventral [illegible]ly with slaty bases; but in one specimen (248, old ♀) [illegible] hairs are white to the roots. General ventral colour [illegible]ding to lower cheeks and upper lip, but, owing to the [illegible]ively pallid dorsal colour, these parts are not so conspicuously contrasted with the rest of the face as in *hildegardeæ*. Hands and feet dirty white. Tail almost naked, dirty white in colour; the short stiff hairs, which form its sparse clothing, pure white. Mammæ 3—2=10, as in the other species.

Skull agreeing in size and general form with those of the previously described species; as in *hildegardeæ*, the greatest zygomatic breadth is behind the level of m^3, not in the centre of the arches as in *instans*. Bullæ decidedly smaller than in either of the other species. Cheek-teeth and incisors as heavy and robust as in *instans*, but upper incisors are not thrown quite so much forwards.

Collector's measurements of type (and those of ♀ 248 in parentheses).—Head and body 134 (137) mm.; tail 96 (105); hind foot 22 (22); ear 16 (16). The hind-foot measurement in females uniformly 22, but in the males (with head and body ranging between 120 and 127) it varies between 22·5 and 24·5.

Skull of type and no. 248 (in parentheses).—Condylo-basal length 30·7 (32·6); condylo-incisive length 31 (32·7); dental length 17·2 (17·1); diastema 8·7 (9·2); cheek-teeth on crowns 5·6 (4·8, but worn to stumps); zygomatic breadth 18 (18·2); interorbital breadth 4·5 (4·8); breadth of brain-case at glenoid region 13·2 (13·3).

This is a very well-marked species, which may be fittingly associated with the name of its discoverer, Capt. Guy C. Shortridge.

XXX.—*A new Tuco-tuco from Tucuman.*
By OLDFIELD THOMAS.

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Ctenomys occultus, sp. n.

A small species nearly allied to *C. juris*.

Size rather less than in *juris*. Colour rather a warmer tinge of brown, more as in *C. bergi* and *latro*; upper surface glossy cinnamon-brown with some vague darkening on the crown, but without a definite blackish forehead. Under surface broadly washed with pale drabby, the chin and throat stronger drabby; some specimens are more whitish below, while among the examples of *juris* some are inclined to be drabby; but on the average *occultus* is decidedly more drabby, especially anteriorly, than *juris*.

Skull agreeing with that of *juris* in its small bullæ, proodont incisors, and the presence of a small sharp-edged ledge projecting over the orbital fossæ, the notch in front of these ledges shorter, sharper, and more abruptly cut out than in other species. Bullæ slightly larger than those of *juris*, though agreeing essentially with them; in *bergi* and *fochi* they are decidedly larger than in either. Zygomata widely spaced, their middle region markedly more convex outwards than in *juris*. Palatal foramina with the small median additional foramen just in front of them much smaller and less conspicuous—indeed, hardly perceptible in some specimens. Palation level with the middle of m^2. Bullæ averaging slightly larger than in *juris*, though agreeing essentially with them.

Incisors rather proodont, index about 102°–104°. Molars smaller than those of *C. juris*.

Dimensions of the type:—

Head and body 138 mm.; tail 55; hind foot 26·5.

Skull: median length 38·7; condylo-incisive length 37·8; zygomatic breadth 25·2; nasals 12·5; interorbital breadth 8·7; least breadth across brain-case 16·5; bi-meatal breadth 24; palatilar length 17·7. Upper tooth-series (crowns) 7·2; diagonal diameter of p^4 3; breadth across outer crowns of p^4 7·8.

Hab. Southern part of Tucuman Province. Type and three other specimens from Monteagudo, about 80 km. S.E. of Tucuman City; one specimen from La Madrid, 15 km. further in the same direction.

Type. Adult female. B.M. no. 20. 7. 6. 8. Original number 5884. Collected 11th May, 1917, by L. M. Dinelli.

Although undoubtedly very closely allied to *C. juris* of Jujuy, this tuco-tuco differs from it by so many little characters that it seems to deserve a special name. The rather larger but still allied species *C. latro* occurs between the two.

XXXI.—*On a Collection of Pycnogonida from the South Orkney Islands.* By W. T. Calman, D.Sc.

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The Museum has recently received from Mr. A. G. Bennett a small collection of Pycnogonida dredged in shallow water at the South Orkney Islands. Among other specimens of interest it includes an example of the remarkable *Decolopoda antarctica*, hitherto known only by the single individual described fifteen years ago by Prof. Bouvier.

Decolopoda antarctica, Bouvier.

Colossendeis antarctica, Bouvier, Bull. Mus. Hist. Nat. Paris, xi. 1905, p. 295.

Decalopoda antarctica, Bouvier, C. R. Acad. Sci. cxlii. 1906, p. 17.

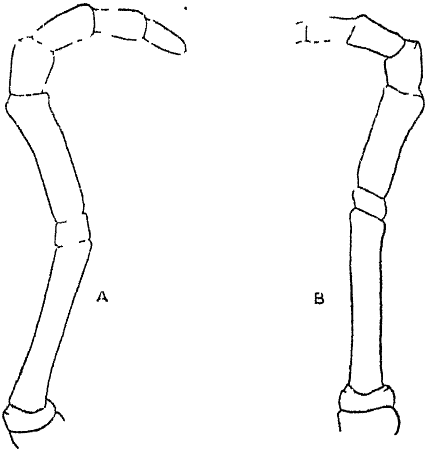
Decolopoda antarctica, Bouvier, "Pycnogonides du 'Français,'" Exped. Antarct. Franç. (1903-1905) 1906, p. 21, pl. i., pl. ii. figs. 1-5, text-figs. 1 & 2.

Locality.—Scotia Bay, South Orkneys; one female.

Remarks.—The specimen hardly differs in size from Bouvier's holotype (also a female), and, except as regards the palps, it agrees very closely with his description and figures. Bouvier states that the palps consist of eight segments, while those of *D. australis* consist of nine, excluding in both cases the basal prominence. In the present specimen the palp of the left side has eight segments and the terminal one is rounded at the tip and only a little more slender than the preceding. The right palp, however, has ten segments, and the terminal one is slender, curved, and claw-like. It may be assumed that this right palp is abnormal, possibly as a result of regeneration following injury; but I know of no other case of abnormality in this group in which the number of segments is greater than the normal.

The assumption of a claw-like form by the terminal segment may, perhaps, be regarded as a case of homœosis, since, although no Pycnogonid has normally a claw on the palp, all the appendages posterior to it may end in claws.

I am unable to perceive any difference between this species and *D. australis* in the form of the female genital openings (*cf.* Bouvier, Pycnog. 'Pourquoi Pas,' 1913, p. 50).



Palps of *Decolopoda antarctica.* A, left; B, right.

Decolopoda antarctica was obtained by the 'Français' at Port Charcot, Booth Wandel Island, in latitude 65° S. Its discovery at about 61° S., in a locality where *D. australis* was previously taken by the 'Scotia,' shows that it is not, as Bouvier suggested, confined to higher latitudes than are reached by the last-named species.

Measurements in millimetres.—

Length of proboscis	17·75	
Greatest diameter of proboscis	4·5	
Length of trunk (including cephalon)	12·5	
Width across second lateral processes	13·0	
Length of abdomen	7·0	
Length of first segment of left chelophore	9·5	
Diameter of ditto at distal end	2·25	
Fourth left leg—		
Coxæ (together)	11·5	
Femur	25·5	
First tibia	27·5	
Second tibia	33·25	
Tarsus	16·5	38·4
Propodus	12·0	
Claw	9·9	

Colossendeis robusta, Hoek.

Colossendeis robusta, Calman, "Pycnogonida," Brit. Antarct. ('Terra Nova') Exp., Zool. iii. no. 1, 1915, p. 21 (with references).

Locality.—Scotia Bay, South Orkneys; one female.

Remarks.—This specimen agrees closely with the male from the 'Terra Nova' collection, which it slightly exceeds in size; but the spinules on the legs, although present, are smaller and apparently fewer. The femur and the second tibia are of equal length.

Pentanymphon antarcticum, Hodgson.

Pentanymphon antarcticum, Calman, "Pycnogonida," Brit. Antarct. ('Terra Nova') Exp., Zool. iii. no. 1, 1915, p. 27 (with references).

Locality.—Scotia Bay, South Orkneys; two specimens.

Remarks.—The ratio between the width of the cephalon anteriorly and that of the neck is about 2·8 in these specimens, which in this respect do not differ from those recorded from the Ross Sea.

Nymphon orcadense (Hodgson).

Chætonymphon orcadense, Hodgson, Trans. Roy. Soc. Edinburgh, xlvi. 1908, p. 173, pl. ii. figs. 2, 2 *a*.

Locality.—S. Orkneys. Dredge. 6 fms. April 1915. Eight specimens (one ovigerous).

Remarks.—Hodgson records an "enormous number of specimens" of this species from Scotia Bay, and some of these, presented to the Museum by Dr. W. S. Bruce, show the closest agreement with Mr. Bennett's specimens.

Ammothea carolinensis, Leach.

Ammothea carolinensis, Calman, Ann. & Mag. Nat. Hist. (8) xv. 1915, p. 310, figs. 1–3 (with synonymy); id. "Pycnogonida," Brit. Antarct. ('Terra Nova') Exp., Zool. iii. no. 1, 1915, p. 51.

Locality.—Scotia Bay, South Orkneys; one female, one immature.

Remarks.—The female is of large size (proboscis 17·5 mm. long), and both specimens resemble very closely those already in the Museum from South Georgia which I have referred to *A. carolinensis*. Although the female is larger than the adult male of *A. gibbosa* figured by Bouvier (Pycnog.

'Pourquoi Pas,' 1913, p. 129, fig. 81), it does not show the enlargement of the dorsal processes of the trunk-somites which seems to be characteristic of full-grown specimens of the last-named species.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

March 24th, 1920.—Mr. R. D. Oldham, F.R.S.,
President, in the Chair.

The following communications were read:—

1. 'On Two Preglacial Floras from Castle Eden (County Durham).' By Mrs. Eleanor M. Reid, B.Sc., F.L.S., F.G.S.

The seeds examined were obtained by Dr. C. T. Trechmann from Preglacial clays, found in fissures of the Magnesian Limestone at Castle Eden. The clays were carried by the Scandinavian ice from the area now covered by the North Sea.

The study proved the presence of two seed-bearing clays, of different ages, the earlier being undoubtedly Pliocene. The Pliocene age is confirmed by M. P. Lesne, who determined the insect-remains found intermingled with the seeds.

While the work was in progress, material from the base of the Pliocene of Pont de Gail (Cantal) gave knowledge, for the first time, of a seed flora of known age, low down in the Pliocene; it showed that the rate of change in the character of the West European Pliocene flora was slower than had been suggested by Clement Reid and the Author.

A critical comparison was made between the Cromerian, Teglian, Castle-Eden, Reuverian, and Pont-de-Gail floras, on the bases of the percentages of all exotics, and of Chinese-North American exotics (that is: plants now inhabiting the Far East of Asia or North America. but not Western Europe), in each flora. The result proved the Reuverian to be Lower Pliocene, not top of the Middle Pliocene (as formerly suggested); and the Castle-Eden flora to be Middle Pliocene.

Therefore a study of fossil seeds had made it possible to discriminate between strata intimately mixed *in situ*, and to determine their geological age when unknown.

Besides being marked by the number of extinct and exotic species which it contains, the Castle-Eden Pliocene is characterized by the absence of aquatic species, and the abundance of those growing on steep banks. From this the Author infers an upland valley, with a gathering-ground standing at least 400 feet, probably much more, above the Middle Pliocene sea-level, in an area now forming part of the North Sea.

2. 'A Comparative Review of Pliocene Floras, based on the Study of Fossil Seeds.' By Mrs. Eleanor M. Reid, B.Sc., F.L.S., F.G.S.

By plotting as a curve the percentages of all exotics, and of Chinese-North American exotics, from the five floras (see last paper), it was found that all lay along a smooth curve, part of which indicated changes in the Pliocene, part in the Miocene. From this curve certain deductions are made :—

(1) That the study of living and fossil seeds can lead to accurate specific determinations.

(2) The position of the Pont de Gail and Cromerian being fixed points on the curve, that is, in time (namely, the beginning and end of the Pliocene), then the position in time of the Teglian, as shown by the curve (based on the study of fossil seeds), agrees with the position indicated by palæontology. Consequently the study of fossil seeds is as accurate a method of determining geological age as palæontology; and the age indicated for the Reuverian and Castle-Eden floras is approximately correct.

(3) The destruction and supplanting of the Chinese-North American exotic flora began about the Middle Miocene, at the time when the great European and Asiatic Alpine ranges attained their maximum uplift; but it was to these transcontinental barriers that Clement Reid and the Author attributed the extermination of this flora. Therefore the curve gives strong and independent confirmation of the truth of their theory, and is in accord with the findings of stratigraphy and palæontology.

(4) The curve indicates an incoming flora—the present flora of Western Europe, and in part, of Central and Southern Europe —which first appeared in the Miocene. Of this the aquatic element is now chiefly circumpolar in distribution, whereas the dry-soil element mainly centres in the Himalaya. The latter character may point to a centre of dispersal, but the question has not yet been studied.

(5) The incoming flora only in part survived in Western Europe; the destruction became greater after the Middle Pliocene; the cause of this is unknown.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 33. SEPTEMBER 1920.

XXXII.—*Notes on various African and Asiatic Species of* Hapalochrus, *Er., with an Account of their accessory ♂-characters* [*Coleoptera*]. By G. C. Champion, F.Z.S.

[Continued from p. 201.]

[Plate VIII.*]

25. *Hapalochrus inchoatus*, sp. n.

♂. Elongate, rather narrow, widened posteriorly, shining, clothed with rather long pallid hairs; cyaneous or violaceous, rarely brassy or golden-green, the elytra often green, the basal three or four joints of the antennæ wholly or in part, the anterior legs (the tarsi excepted), and the intermediate femora at the base beneath or entirely, testaceous, the rest of the antennæ and legs black or metallic, the abdomen flavescent and nigro-maculate. Head sparsely punctulate, shining; antennæ long, rather stout, joints 2–10 almost equal in width, much longer than broad. Prothorax broader than long, sparsely punctulate laterally, smooth on the disc. Elytra densely, rugulosely, and not very coarsely punctate. Anterior trochanters toothed; anterior femora (Pl. VIII. fig. 22) with a small tooth at the base; anterior tibiæ dilated and obliquely excavate beyond the middle; anterior tarsal joint 2 prolonged over 3; intermediate femora excavate at the base beneath; intermediate tibiæ (Pl. VIII. fig. 22 *a*) strongly incrassate, convex, subtriangular, excavate at the apex within, and furnished with a long, sinuous, curved appendage at the inner apical angle and a shorter appendage beneath the outer angle.

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* [The Plate will be published with the concluding part of the article.]

Var. ♂. Anterior trochanters simple; intermediate tibiæ testaceous. [Congo da Lemba.]

♀. Antennæ very similar to those of ♂; legs black.

Length $3\frac{1}{2}$–5, breadth $1\frac{1}{4}$–$2\frac{1}{10}$ mm. (♂ ♀.)

Hab. W. CENTRAL AFRICA, Belgian Congo: Amadi (*P. van den Plas*: ♂ ♀: types), Congo da Lemba (*R. Mayné*: ♂ ♀: var.), Wombali (*P. Vanderijst*), Bambili (*Dr. Rodhain*), Nyangwe (*R. Mayné*), Beni-Lesse (*Dr. Murtula*), &c.

Described from a series of upwards of 100 examples, the sexes in about equal numbers, belonging to the Congo Museum. The form with dark intermediate tibiæ in ♂ is represented by more than 50 specimens from Amadi, and the one with these tibiæ red in ♂ by at least a dozen from Congo da Lemba. A female of it in the same Museum has been named by Pic *H. testaceicornis*, this insect being separable from the same sex of *H. azureus* as here understood by the stouter antennæ, and the finer and denser puncturing of the elytra, and from that of *H. testaceicornis* by the shining, less rugose head. The more strongly appendiculate intermediate tibiæ of the ♂ distinguishes *H. inchoatus* from *H. dahomeyanus*, these two forms having the antennal joints undilated as in ♀ ♀ of *H. testaceicornis* and *H. fusicornis*.

26. *Hapalochrus fusicornis*, sp. n.

♂. Moderately elongate, rather convex, shining, clothed with semi-erect, whitish pubescence; bluish-green or green, the basal half of the antennæ (a dark streak on joint 1 excepted), the anterior femora at the tip, the intermediate femora at the base in front, and the anterior tibiæ entirely, testaceous. Head short, nearly as wide as the prothorax, closely, finely punctulate; antennæ stout, moderately long, tapering from joint 3, the latter much thickened and longer than 2. Prothorax transverse, convex, obliquely narrowed posteriorly, smooth on the disc, finely punctate at the sides. Elytra oblong, at the base about as broad as the prothorax, a little widened posteriorly, densely, rugulosely punctate. Anterior trochanters unarmed; anterior femora with a small tooth at the base; anterior tibiæ moderately widened, simply sinuate and compressed; anterior tarsal joints 1 and 2 rather long, somewhat thickened, 2 extending over 3; intermediate tibiæ stout, simply sinuate on their inner and outer aspects, appearing subangulate when viewed from the side.

♀. Antennæ more slender, feebly serrate, joint 3 not dilated, 1–3 partly testaceous; legs almost wholly black or metallic.

Length 4–4½, breadth 1⅗–2 mm.

Hab. W. AFRICA, Cotonou in Dahomey, 70 miles due W. of Lagos (*W. A. Lamborn*: v., vi. 1914, vi. 1915).

Two males and three females. Very like the Nigerian *H. dilaticornis*, the ♂ with stout, much less dilated, tapering antennæ, with enlarged third joint, the anterior and intermediate tibiæ moderately thickened and simply sinuate, the latter subangulate externally and not bilobate at tip. More robust than *H. azureus*, Er. (=*cæruleus*, Murr.), the antennæ stouter in both sexes, the ♂-characters very different. The allied *H. tschoffeni*, Pic (1907), from the Congo, type ♂, has tapering, less thickened antennæ, with smaller third joint, basally dentate anterior femora, moderately inflated intermediate tibiæ, &c. *H. diversipes*, Pic (1919), type ♂?, incorrectly treated as a variety of *H. sjöstedti*, seems to have similar antennæ.

27. *Hapalochrus dahomeyanus*, sp. n.

♂. Extremely like *H. fusicornis*: antennæ feebly serrate, formed and coloured as in the ♀ of that species, the third joint not dilated; anterior femora (except along their upper edge) and tibiæ, and the intermediate femora beneath, testaceous; anterior femora with a slender tooth at the extreme base; anterior tibiæ twisted and dilated, compressed and excavate towards the apex; anterior tarsal joints 1 and 2 slightly thickened, 2 extending over 3; intermediate tibiæ very stout, elongate-triangular, not angulate at the middle externally, furnished with a short, broad, compressed, testaceous lobe at the inner apical angle, and with a short tooth beneath the outer angle; elytra a little smoother at the base.

Length 4, breadth 1¼ mm.

Hab. W. AFRICA, Cotonou in Dahomey (*W. A. Lamborn*: 31. v. 1914).

One ♂, found at the same locality as *H. fusicornis*, differing from it as stated above.

28. *Hapalochrus tschoffeni.*

Hapalochrous tschoffeni, Pic, Ann. Soc. Ent. Belg. li. p. 384 (♂) (1907).

♂. Antennæ testaceous (except at the tip), rather stout, tapering towards the apex; anterior legs (the tips of the tarsi excepted) testaceous, the trochanters unarmed, the femora with a long, slender tooth at the extreme base, the tibiæ moderately dilated and excavate beyond the middle, the tarsal joint 2 produced over 3, nigro-pectinate at tip; intermediate femora testaceous to near the apex, excavate at the base beneath; intermediate tibiæ gradually incrassate towards the tip, transversely hollowed before and at the apex beneath, and without lobe at the inner apical angle.

Hab. W. CENTRAL AFRICA, Boma, Congo (*type of Pic*), Congo da Lemba (*R. Mayné, in Mus. Congo Belge*).

The above description of the ♂ is taken from a specimen in the Congo Museum, captured by M. Mayné in January or February 1913. It is doubtful if the ♀ is distinguishable from the same sex of several of the allied forms. The ♀ has the intermediate tibiæ much less incrassate than in *H. testaceicornis*, *H. dilaticornis*, &c., and they are more thickened distally and less sinuate than in *H. fusicornis*.

29. *Hapalochrus appendicifer.*

♂. *Hapalochrus appendicifer*, Pic, L'Echange, xx. p. 34 (1904).
Var. ♀. *Hapalochrus martini*, Pic, *loc. cit.* p. 28.

♂. Antennæ stout, joint 2 much longer than 3, testaceous, 4–9 about as long as broad; anterior tibiæ obscure testaceous or piceous, curved, broad, rapidly widened to near the tip and then sinuously, obliquely compressed and deeply excavate, the apical portion narrow; anterior tarsal joints 1 and 2 thickened, subequal in length, 2 narrowly extended over 3; intermediate femora deeply, abruptly excised before the apex (appearing angulate at the middle); intermediate tibiæ (Pl. VIII. fig. 19) very stout, curved, dilated to near the apex within and then obliquely narrowed to the tip, the angle thus formed bearing a long, slender, compressed, subtruncate, free appendage, the outer apical angle with a short tooth beneath.

Length 4–4½, breadth 1⅗–2 mm. (♂ ♀.)

Hab. S.E. AND E. AFRICA, Dunbrody [Uitenhage] (*Rev. O'Neil*; type of Pic, ♂), Durban (*H. W. Bell Marley*: xii. 1901: ♂), Malvern (*G. A. K. Marshall*: ♀), Zambesi (*Mus. Brit.*: ♀), Zanzibar (*Revoil, ex coll. Fry*: ♀), Karonga, Nyasaland (*S. A. Neave*: ♀); Manyema (*Dupuis, in Mus. Congo Belge*: ♂ ♀).

The British Museum possesses a ♂ of this species from Durban agreeing with Pic's description of *H. appendicifer*, and with another specimen of the same sex from Manyema named by the author. Females from Malvern and Zambesi, green or brassy-green in colour, with the elytra more sparsely and less coarsely punctured at the base, are apparently referable to *H. martini*, Pic, described a little earlier in the same year; and another example of the same sex from Zanzibar, brilliant cyaneous in colour, can be placed under *H. appendicifer* for the present. *H. mashunus*, Gorh., and various other African *Hapalochri* have very similar tibial appendages.

30. *Hapalochrus ærosus.*

Hapalochrus ærosus, Gorh. Ann. & Mag. Nat. Hist. (7) vii. p. 359 (♂ ♀) (1901).

♂. Antennæ stout, subserrate; anterior trochanters with a long tooth; anterior femora curved, feebly angulate and bearing a small tuft of hairs near the base beneath; anterior tibiæ widened to near the tip and then obliquely compressed and deeply emarginate; anterior tarsal joints 1 and 2 slightly thickened, 2 extending over 3; intermediate femora curved, stout, angularly dilated and inferiorly foveate at the middle (appearing deeply excised at the base); intermediate tibiæ very stout, broadly widened outwards, and with a short, flattened, retractile lobe arising from above the inner angle, the lower surface deeply foveate at the middle and obliquely excavate towards the apex.

♀. Antennæ more slender.

Hab. S.E. Africa, Kopjes west of Lesapi River, Chirinda (*G. A. K. Marshall*).

Twelve specimens seen, including five males. Separable from *H. mashunus* by the brassy colour, coarser elytral puncturing, and the different ♂-characters. Gorham did not note the strong, angular dilatation of the intermediate femora in that sex of the present species, of which there is no trace in *H. mashunus*. The ♂, too, has both the intermediate femora and tibiæ foveate at the middle beneath.

31. *Hapalochrus longicornis*, sp. n.

♂. Moderately elongate, narrow, shining, closely pubescent; cyaneous or bluish-green, the antennæ (the testaceous lower surface of one or more of the basal joints excepted), palpi, and legs black or metallic, the ventral sutures testaceous. Head closely punctulate; antennæ subfiliform, very long, reaching to at least the middle of the elytra, rather stout. Prothorax slightly broader than long, rounded at the sides, the lateral portions densely, rugulosely punctate, the disc almost smooth. Elytra not very elongate, widened posteriorly, rounded and rather convex at the apex, depressed on the disc anteriorly; densely, rather coarsely punctate. Anterior trochanters with a minute tooth; anterior tibiæ angularly dilated at the middle, and excavate and compressed beyond this; anterior tarsal joints 1 and 2 slightly thickened; intermediate femora arcuately hollowed before the apex beneath (appearing angulate at the middle); intermediate tibiæ (Pl. VIII. fig. 20) broadly, abruptly incrassate from near the base to the apex, slightly excavate and with a very small compressed lobe near the inner apical angle, the lower surface foveate at about the middle.

♀. Antennæ much shorter and not nearly so stout, the joints always considerably longer than broad.

Length 2½–3½, breadth 1⅒–1½ mm. (♂ ♀.)

Hab. W. Central Africa, Belgian Congo: Amadi [type] (*P. van den Plas*: iii., iv. 1913: ♂ ♀), Coquilhatville, Watsa, Kindu, Bamba (*L. Burgeon*: ♂ ♀), Itoka, Mobwasa, Ganda-Sundi (*R. Mayné*: ♂ ♀).

Described from a series of about thirty males and forty females belonging to the Congo Museum. Very like *H. densatus*, Bourg. (No. 41), the ♂ with much longer and stouter antennæ, less dilated anterior tibiæ, and broader, less excavate intermediate tibiæ, the elytra relatively shorter. The antennæ are less dilated in the ♂, and the elytra more coarsely punctured, than in *H. mashunus* (No. 39). The females of these insects are scarcely distinguishable one from another.

32. *Hapalochrus patruelis*, sp. n.

♂. Extremely like *H. longicornis*, cyaneous, the head and prothorax violaceous, the antennal joints 1–5 (the upper surface of 1 excepted) testaceous, the others black, the legs nigro-cyaneous; antennæ much shorter, barely reaching the middle of the elytra, rather stout, somewhat filiform; head closely punctulate; prothorax transverse, rugulosely punctate at the sides; elytra densely, roughly punctate; anterior trochanters with a long slender tooth; anterior tibiæ dilated at the middle; intermediate femora deeply, arcuately hollowed before the apex beneath (appearing sharply toothed at the middle); intermediate tibiæ somewhat broadly dilated from near the base to the apex, slightly excavate and with a very short compressed lobe at the inner apical angle.

♀. Antennæ more slender and less elongate, the basal joints darker.

Length 2½–3, breadth 1⅕–1⅓ mm. (♂ ♀.)

Hab. W. Central Africa, Belgian Congo: Wombali (*P. Vanderijst*: vii., ix. 1913: ♂ ♀) and Kabambare (*Flamand*: 8. iii. 1907: ♀).

Described from eight specimens from Wombali, including two males, belonging to the Congo Museum. Very like *H. longicornis*, the ♂ with the antennæ less elongate and testaceous in their basal half, a longer tooth to the anterior trochanters, and more sharply angulate intermediate femora. *H. kolbei*, Bourg., from Kilimandjaro, &c., seems to be an allied larger form, with the anterior femora and tibiæ partly testaceous in the ♂, and the head densely rugose.

33. *Hapalochrus semicupreus.*

♂. *Apalochrus semicupreus* and var. *moloensis*, Pic, Mélanges exot.-entom. xxxi. p. 10 (Oct. 1919) (part.).

♂. Moderately elongate, rather convex, shining, somewhat thickly clothed with long, erect, fuscous hairs; head, prothorax, and scutellum brilliant cupreous, golden, or golden-green, the elytra cyaneous, the antennæ (the testaceous outer and inner edges of joints 1–3 excepted), palpi, legs, and abdomen metallic or black. Head short, sparsely, somewhat coarsely punctate; antennæ long, rather slender, joints 2–9 elongate, subcylindrical. Prothorax convex, a little broader than long, abruptly, obliquely narrowed at the base; sparsely, coarsely punctate, the punctures becoming more crowded towards the sides. Elytra about as broad as the prothorax at the base, gradually widened to beyond the middle and bluntly rounded at the apex, the lateral margins prominent; coarsely, confluently, rugosely punctate. Anterior trochanters with a long tooth; anterior tibiæ obliquely widened and dentate towards the tip within, the space between this and the apex diaphanous and deeply emarginate; anterior tarsal joints 1 and 2 slightly thickened, subequal in length (when viewed in profile), 2 narrowly extended over 3; intermediate tibiæ greatly thickened, subtriangular, convex and rounded externally, excavate beneath, and with a short compressed lobe at the inner apical angle.

♀. Antennæ shorter and more slender; head and prothorax a little narrower; elytra inflated, more rounded at the sides; wings squamiform, extremely rudimentary.

Length 4–4¾, breadth 2–2½ mm. (♂ ♀.)

Hab. E. AFRICA (*Mus. Brit.*, *ex Gregory coll.*: 1891: ♀), Western foot of Aberdare, alt. 8000 ft., and W. slopes of Kenya, on Meru-Nyeri Road, alt. 6000–8500 ft. (*S. A. Neave*: ii., iii. 1911), Elgon District (*Dr. Bayer, in Mus. Congo Belge*).

The above description is taken from a long series, ♂ ♀, captured by Dr. Neave in 1911. Recognizable by the brilliantly metallic golden, cupreous, or green, rather coarsely punctured head and prothorax, and the cyaneous, very rugose elytra, the ♀ almost apterous and having the elytra inflated as in the same sex of *H. amplipennis*, Harold. The rather coarsely punctured head and prothorax, the strongly toothed anterior trochanters and the longer second joint of the anterior tarsi of the ♂, &c., separate *H. semicupreus* from the last-named insect.

The incomplete diagnosis of Pic (excluding his subsp. *kenyensis* and var. *viridimetallicus*) doubtless applies to the present species, the type of which was from "E. Africa."

34. *Hapalochrus viridicollis*, sp. n.

♂. Moderately elongate, sparsely pubescent and fusco-hirsute; brilliant golden-green, the elytra cyaneous, the antennæ, legs, and under surface black or metallic. Head and prothorax almost smooth, the latter broader than long, abruptly, sinuously narrowed at the base; antennæ rather long and slender; elytra gradually widened posteriorly, rounded at the apex, densely, coarsely, confluently punctate; anterior trochanters without tooth; anterior tibiæ moderately dilated at the middle, deeply, obliquely excavate towards the apex within, and abruptly emarginate and diaphanous on its inner edge before the tip; anterior tarsal joints 1 and 2 thickened, 2 (when viewed in profile) perceptibly prolonged over the base of 3; intermediate tibiæ long, somewhat sinuate, greatly, subequally thickened from near the base to the apex, convex externally, and with a short compressed lobe at the inner apical angle.

♀. Elytra rounded at the sides, convex; wings rudimentary.

Length 4–4½, breadth 2¼ mm. (♂ ♀.)

Hab. E. Africa, S.E. slopes of Kenya [♂] and Kikuyu Escarpment [♀], alt. 6000–7400 ft. (*S. A. Neave*: ii., iii. 1911).

One pair, precisely similar in colour and in their elytral sculpture. A species separable from the allied forms with subapterous females by the subequally incrassate, distinctly sinuate intermediate tibiæ of the male, and the confluent, coarse sculpture of the elytra in the two sexes. The anterior trochanters of the ♂ want the tooth present in the same sex of *H. semicupreus* and *H. triangularis* (No. 61); and the anterior tibiæ in this sex are not dilated into a tooth as in *H. amplipennis* (No. 65). The second anterior tarsal joint of the ♂ appears to be simple till the tarsus is viewed in profile.

35. *Hapalochrus platycerus*, sp. n.

♂. Elongate, narrow, bluish-green or cyaneous, the antennæ black; clothed with whitish pubescence intermixed with longer, semi-erect, soft hairs. Head nearly as wide as the prothorax, almost unimpressed, densely, rugosely, punctate; antennæ moderately elongate, stout, joints 5–9 broadly, obliquely dilated, 7–9 twice as broad as long, 10 oblong. Prothorax convex, a little broader than long, rounded at the sides, obliquely narrowed behind, rugosely punctured laterally, much smoother on the disc. Elytra long, widened posteriorly, rounded at the apex, densely, rugulosely punctate. Anterior femora thickened, bearing a small tuft of stiff hairs at the base; anterior tibiæ stout, sinuous within, obliquely compressed and with a narrow diaphanous space on their inner aspect before the tip; anterior tarsal joints 1 and 2 stout, 1 longer than 2, 2 extending over 3; intermediate tibiæ curved, convex externally, broadly, abruptly widened from near the base, strongly sinuate and excavate within, and with a rather broad, compressed appendage near the inner apical angle and a narrow appendage below the outer angle.

♀. Antennæ shorter, joints 5–9 much less dilated, 4–8 gradually widened.

Length 6, breadth 2 mm. (♂ ♀.)

Hab. E. Africa, Lukanga in N. Rhodesia (*H. C. Dollman*: 24. iv. and 1. v. 1915).

One pair. In this insect the antennæ of the ♂ are greatly dilated (joints 6–9 being broadly lamellate) and the head is strongly rugose in both sexes. The ♂ has the anterior tibiæ formed as in *H. clavicornis*, and the intermediate tibiæ broadly widened, sinuate and excavate within, and bearing a rather broad compressed appendage near the inner apical angle.

36. *Hapalochrus rugosus*, sp. n.

♂. Moderately elongate, rather dull, the prothorax shining; blue or bluish-green, the antennæ, palpi, and legs black or metallic, the intermediate tibiæ of ♂ testaceous at the apex within, the ventral sutures rufescent; thickly clothed with shaggy whitish pubescence intermixed with long, erect, soft hairs. Head short, flattened, densely, rugosely punctate; antennæ moderately long, serrate, dilated from the fifth joint onward. Prothorax broader than long, obliquely narrowed behind, rugosely punctured at the sides, very sparsely and minutely so on the middle of the disc, the transverse grooves shallow. Elytra rather elongate, widened posteriorly, densely, rugosely punctured. Anterior femora thickened; anterior tibiæ stout, obliquely compressed, excavate, and deeply emarginate before the apex; anterior tarsal joints 1 and 2 stout, 2 extending over 3; intermediate tibiæ greatly swollen, broadly widened from near the base to the apex, slightly sinuate towards the tip within, deeply, sinuately excavate in their outer half beneath, and furnished beyond the middle with a rather broad, testaceous, compressed appendage, the excavated portion bearing an inwardly-curved tuft of matted yellowish hairs below the outer angle.

♀. Antennæ a little more slender.

Length $4\frac{3}{4}$–$5\frac{1}{4}$, breadth 2–$2\frac{1}{2}$ mm. (♂ ♀.)

Hab. S. Africa, Howick, Natal (*J. P. Cregoe*).

Sixteen specimens, the sexes in equal numbers. Larger, duller, and less shining than *H. appendicifer*, Pic, the head, the sides of the prothorax, and the elytra densely, roughly punctate, the ♂-characters different, the appendage of the middle tibiæ much shorter and broader, the excavated inferior portion bearing a matted tuft of curled hairs below the outer apical angle. This structure cannot be seen properly unless the insect is viewed from beneath. Less elongate than *H. plotycerus*, from Rhodesia, which has a similarly rugose head, the antennæ much less dilated, the apices of the intermediate tibiæ differently formed. Larger than *H. rugaticeps*, Bourg., from Meru, and with a still more rugosely puctured head and prothorax, the elytra less parallel, the antennæ (♀) stouter.

37. *Hapalochrus fissipes*, sp. n.

♂. Moderately elongate, narrow, very shining, finely pubescent, and also thickly set with long erect hairs; cyaneous or bluish-green, the basal four joints of the antennæ beneath or in part, the anterior tibiæ (except at the base and apex), the intermediate femora at the base and the accompanying trochanters, and the abdomen (a series of dark spots along each side excepted), testaceous. Head and prothorax very sparsely punctulate, the latter smooth on the disc and nearly as long as broad; antennæ moderately long, joints 5–9 obliquely dilatate, 6–9 strongly transverse. Elytra much widened posteriorly, rounded at the tip, closely, rather coarsely punctate, smoother at the base. Anterior tibiæ broadly lobed at about the middle, and excavate beneath this, the apical portion narrow and compressed;

anterior tarsal joints 1 and 2 slightly thickened, 2 projecting over 3; intermediate tibiæ (Pl. VIII. fig. 21) very strongly incrassate, subtriangular, excavate in their apical third within, and furnished with a rather long, retractile, subtruncate appendage at about one-fourth from the apex (the tibiæ thus appearing deeply cleft at the tip when the appendage is drawn out of the cavity), the outer apical angle toothed beneath, the lower surface of the tibia bifoveate.

♀. Antennæ feebly serrate, joints 5–9 narrow, about as long as broad, almost equal in width; legs black.

Length 3½–3¾, breadth 1¼–1½ mm. (♂ ♀.)

Hab. W. CENTRAL AFRICA, Belgian Congo: Amadi [type] (*P. Van den Plas*: ii.–iv. 1913: ♂ ♀), Congo da Lemba (*R. Mayné*: xii. 1912, iv. 1913: ♂ ♀), Dolo (*F. Chatin*: xi. 1912: ♂ ♀), Wombali (*P. Vanderijst*; vii., ix. 1913: ♂ ♀).

Described from a series of 22 specimens belonging to the Congo Museum, including eight males; some females from Manyema in the same Museum, named *H. appendicifer* by Pic, may belong here. Compared with the last-named insect, the ♂ of the present species may be recognized by the obliquely dilated, transverse outer joints of the antennæ, the less dilated anterior tibiæ, the shorter retractile appendage to the middle tibiæ, the much finer puncturing of the elytra, and the less robust build. The ♀ is very like the same sex of the insect here determined as *H. azureus*, Er. The allied *H. duvivieri*, Pic (? = *azureus*, Er.), type ♂, is said to have subfiliform antennæ and coarsely punctured elytra.

38. *Hapalochrus azureus.*

Apalochrus azureus, Erichs. Entomographien, p. 53 (♂) (1840).
? *Apalochrus cribrarius*, Thoms. Archives Ent. ii. p. 79 (1858).
Hedybius cæruleus, Murray, Ann. & Mag. Nat. Hist. (3) xx. p. 321 (1867)*.
? *Hapalochrous duvivieri*, Pic, Ann. Soc. Ent. Belg. li. p. 384 (♂) (1907).

♂. Anterior trochanters with a sharp tooth; anterior femora obsoletely subangulate at the middle beneath; anterior tibiæ moderately widened, sinuate within, obliquely compressed and excavate towards the apex; anterior tarsal joints 1 and 2 slightly thickened, 2 narrowly extending over 3; intermediate femora and tibiæ usually obscure testaceous, the latter (Pl. VIII. fig. 23) very stout, subtriangular, excavate at the apex beneath, and with a short broad lobe below the inner apical angle.

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* Omitted from the Munich Catalogue, vi. 1869.

♀. Antennæ darker, the legs black.

Length $3\frac{1}{5}$–$4\frac{1}{2}$, breadth $1\frac{1}{2}$–$2\frac{1}{3}$ mm. (♂ ♀.)

Hab. W. AND CENTRAL AFRICA, Guinea (*type of Erichson*: ♂), Gaboon (*type of Thomson*), Old Calabar (*Mus. Brit.*, *types of Murray*: ♂ ♀), Lagos, Kamerun, Sierra Leone (*Mus. Brit.*), Gold Coast, Bompata, Ashanti (*A. E. Evans*), Aburi (*W. H. Patterson*); Uganda (*S. A. Neave*, *C. C. Gowdey*); Belgian Congo, Ibembe (*type of Pic*: ♂), Casai (*A. Crida, in Mus. Genoa*), Congo da Lemba, Amadi, Mayumbé-Kiniati, Benza-Masoia, Kisantu, Itoka, Coquilhatville, Ganda-Sundi, Mobwasa, Kilo, Wombali, Yambata, Lukula, Mandungu, &c. (*Mus. Congo Belge*).

A rather small, narrow, somewhat convex, cyaneous or bluish-green form; the antennæ comparatively slender, subfiliform, testaceous in ♂, with the apical joints usually, and sometimes the basal ones above, infuscate or black; the head and prothorax very shining, the eyes rather large; the elytra closely, coarsely, rugulosely punctate, sometimes with a brassy lustre; the anterior and intermediate tibiæ and the intermediate femora usually obscure testaceous in ♂. This is the only W. African *Hapalochrus* known to me to which Erichson's brief description would apply; his type, ♂, wanted the posterior legs. Murray omitted to mention the sexual characters of his *H. cæruleus*, and Thomson is also silent in this respect. The British Museum has a long series of the present species from various localities on the W. coast of Africa, as well as many from Uganda. In the Belgian Congo, *H. azureus* must be an abundant insect, as there are upwards of 550 examples of it in the Congo Museum, including about 130 males; but the species is not represented in Dollman's Rhodesian Collection. A very small ♂ from Wombali has much narrower intermediate tibiæ, and it may not be conspecific with others from the same locality. The *H. duvivieri*, ♀, of the Congo Museum collection, named by Pic, has the antennal joints 2 and 3 greatly elongated, and it probably belongs to *Laius spinicoxis*, of the same author; *H. sinuatipes*, Pic (1911), from E. Africa, seems to be an allied form.

39. *Hapalochrus mashunus.*

Hapalochrus mashunus, Gorh. Ann. & Mag. Nat. Hist. (7) vii. p. 359 (♂ ♀) (1901).

♂. Antennæ serrate, rather broad; anterior trochanters unarmed; anterior tibiæ compressed and excavate before the apex within; anterior tarsal joints 1 and 2 slightly thickened, 2 extending over 3; intermediate tibiæ (Pl. VIII.

fig. 24) strongly incrassate, deeply excavate towards the apex within, and furnished with a long, compressed, sinuous, retractile appendage, their lower surface deeply sinuato-excavate from the middle to the apex, the cavity fringed with long whitish hairs on its outer edge, the inner apical angle with a short tooth.

♀. Antennæ shorter and more slender.

Hab. S.E. AND E. AFRICA, Salisbury [type of Gorham], Chirinda in Gazaland, and Frere and Estcourt in Natal (*G. A. K. Marshall*: ♂ ♀), Livingstone (*H. C. Dollman*: ♀), Kashitu and Mwengwa in N. Rhodesia (*H. C. Dollman*: ♂ ♀), El Donyo eb Urro (*C. S. Betton*: ♂), Mlanje in Nyasaland and Kakindu in Uganda (*S. A. Neave*: ♀).

There are twenty examples of this species before me, including ten males. Gorham does not mention the retractile long, curved, tibial appendage of the ♂, which cannot be seen properly unless the tibia is viewed from beneath (see figure). A small cyaneous or bluish-green form, with black legs and antennæ, the elytral puncturing dense and fine. Fresh examples are thickly clothed with whitish pubescence, which is easily abraded.

H. densatus and *H. rugaticeps*, Bourg., both from Kilimandjaro or Meru, co-types, ♀ ♀, of which are before me, are allied forms.

40. *Hapalochrus laciniosus*, sp. n.

♂. Rather short, shining, pubescent, with longer, soft, semi-erect hairs intermixed; green or brassy green, the antennæ, palpi, and legs black. Head short, sparsely punctulate, slightly depressed in front; antennæ moderately long, rather stout, serrate, joints 3–9 about as long as broad. Prothorax transverse, a little wider than the head, sparsely punctured, almost smooth on the middle of the disc. Elytra moderately long, widened posteriorly, densely, very finely punctate. Anterior femora subangulate near the base beneath; anterior tibiæ thickened, obliquely compressed and deeply emarginate near the tip; anterior tarsal joints 1 and 2 thickened, 2 extending over 3; intermediate tibiæ (Pl. VIII. fig. 25) very stout, broadly widened, sinuate within, obliquely, deeply excavate towards the apex beneath, and furnished with a long, slender, compressed, sinuate, retractile appendage, the inner apical angle with a long tooth, the inner edge only of the cavity fringed with long hairs.

♀. Antennæ shorter and not so stout, the legs slender.

Length $3\frac{1}{2}$–$3\frac{3}{4}$, breadth $1\frac{1}{2}$–$1\frac{2}{3}$ mm. (♂ ♀.)

Hab. S.E. Africa, Howick in Natal (*J. P. Cregoe*: ♂), Durban (*F. Muir*: ♀), Zululand (*ex coll. Fry*: ♂ ♀).

Two males and three females. Very like *H. mashunus*, Gorh., the ♂ with broader intermediate tibiæ, which on the lower surface are deeply, obliquely excavate and ciliate along the inner edge only, and have a longer tooth at the inner angle. The imperfectly described *H. rollei*, Pic (1911), length 4·6 mm., from "E. Africa," the ♂ of which has stout, appendiculate middle tibiæ, seems to be a close ally of the present species. *H. appendicifer*, Pic, has more coarsely punctured elytra, etc.

41. *Hapalochrus densatus.*

Hapalochrus (*Paratinus*) *densatus*, Bourg. in Sjöstedt's Kilimandjaro-Meru Exped., i. Abt. 7, No. 10, p. 136 (♂ ♀) (1908).

♂. Antennæ rather slender, subfiliform, moderately long; anterior trochanters unarmed: anterior tibiæ feebly dilated beyond the middle and excavate before the apex; anterior tarsal joints 1 and 2 slightly thickened, 2 projecting over 3; intermediate femora sinuate (not angulate) beneath; intermediate tibiæ rather broadly, abruptly incrassate from about the basal third to the tip, deeply excavate and furnished with a compressed, curved, retractile appendage before the apex within.

Hab. E. and W. Central Africa, Kilimandjaro and Meru, Kibonoto (*Dr. Sjöstedt*), Hima River, Uganda (*Dr. Bayer*: 4.iv.1912: ♂), Wombwali, Belgian Congo (*P. Vanderijst*: vii., ix. 1913: ♂ ♀).

Females from Wombwali in the Congo Museum agree with a co-type of the same sex of *H. densatus* lent me by Dr. Sjöstedt; but the identification of the four males from that locality and from the Hiva River is somewhat doubtful, Bourgeois not having mentioned the appendage of the intermediate tibiæ, which, however, is not always visible at first sight. These specimens (length 3–3½ mm.) have the elytra a little more elongate than in *H. longicornis* and *H. patruelis*, and are clothed with rather long whitish hairs, the male having slender antennæ, unarmed anterior trochanters, and the intermediate femora simply sinuate beneath. *H. mashunus*, Gorh., has broader antennæ in the ♂, the elytra more finely punctured, &c.

42. *Hapalochrus cinerascens*, sp. n.

♀. Elongate-subtriangular, shining, thickly clothed with long, adpressed, cinereous pubescence, with a few semi-erect hairs intermixed; bluish-green, the antennæ (the testaceous lower surface of the basal joints excepted) and legs black. Head and prothorax rather small, sparsely, minutely punctate, the latter transverse, rounded at the sides, and almost smooth on the middle of the disc. Elytra rather long, rapidly widening to near the apex, bluntly rounded at the tip, transversely depressed on the disc below the base; densely, finely, rugulosely punctate.

Length $3\frac{3}{4}$, breadth 2 mm.

Hab. Abyssinia (*Mus. Brit.*).

One female. This insect seems to be nearest allied to *H. mashunus*, Gorh., and *H. densatus*, Bourg., and it is separable from the corresponding sex of those species by having the elytra much more widened posteriorly, the puncturing of the latter being very fine and dense. Three species only of the genus have been seen by me from Abyssinia, each represented by a single example. The one here described is so distinct that there can be little risk in naming it from the female sex.

43. *Hapalochrus janthinus.*

♀. *Hapalochrus janthinus*, Fairm. Ann. Soc. Ent. Fr. (6) iii. p. 157 (1887).

Hapalochrus (*Paratinus*) *janthinus*, Bourg. in Sjöstedt's Kilimandjaro-Meru Exped. i. Abt. 7, No. 10, p. 134 (♂ ♀) (1908).

♀. *Hapalochrous goossensi*, Pic, Ann. Soc. Ent. Belg. lii. p. 311 (1908).

Elongate, rather convex, shining, somewhat thickly clothed with long, semi-erect, blackish hairs; bluish-green or cyaneo-violaceous, or, more rarely, æneous, purplish, or obscure cupreous, the antennæ and legs black or metallic, the abdomen usually in part red, the intermediate femora sometimes with a reddish spot at the base in ♂. Head sparsely, finely punctate; antennæ (♂) long, in some specimens broad, serrate, and tapering towards the tip, in others less thickened, subserrate, and with joints 2–10 almost equal in width, (♀) shorter and more slender. Prothorax transverse, broader than the head, smooth on the disc, sparsely punctulate at the sides and apex. Elytra long, rather convex, gradually widening to beyond the middle, rounded at the apex, coarsely, closely, confusedly punctured.

♂. Anterior trochanters unarmed; anterior tibiæ rather stout, thickened at the middle, and then strongly, obliquely compressed; anterior tarsal joints 1 and 2 subequal in length, 2 narrowly extended over 3; intermediate tibiæ very stout, slightly rounded externally, foveate and deeply excavate in their outer half beneath, and with a short compressed lobe at the inner apical angle, and a curved, dentiform pencil of hairs beneath the outer angle.

Length 5–7, breadth $2\frac{1}{2}$–$3\frac{1}{4}$ mm. (♂ ♀.)

Hab. E. AND W. CENTRAL AFRICA, Usagara (*type of Fairmaire*: ♀), Kibonoto, Kilimandjaro, Meru (*Dr. Sjöstedt*), Ruwenzori, alt. 5300 ft. (*Scott-Elliot*), Uganda generally, up to 5000 ft. (*S. A. Neave, C. C. Gowdey*), S. Masai Reserve (*T. J. Anderson*), Nandi Plateau, W. slopes of Kenya on Meru–Nyeri Road up to 6,200 ft., Kambove, Katanga, and Serenje District in N.E. Rhodesia (*S. A. Neave*), Mogorr River (*Capt. A. O. Luckman*), Kashitu in N.W. Rhodesia (*H. C. Dollman*); Kisantu (type of *H. goossensi*, Pic, ♀), Congo da Lemba, Kundi, Kambove-Ruwe, Etshushu, Wombali, Kasenga, and Sankisia, Belgian Congo (*Mus. Congo Belge*), Madona (*Dr. S. Neave*); Angola (*Mus. Brit.*: ♂ ♀).

The Congo Museum possesses a series of upwards of 2200 examples of this species (mostly from Congo da Lemba), of which about 130 are males, and in the British Museum there are at least 200 more, including twenty males. The types of *H. goossensi*, Pic, ♀, lent me by M. Schouteden, agree perfectly with *H. janthinus*, Fairm., ♀, as identified by Bourgeois. The ♂ sometimes has a reddish mark at the base of the intermediate femora; but the second joint of the anterior tarsi is not simple in this sex, as he supposed, the claw-like upper prolongation being conspicuous in one of his Kilimandjaro males before me. In the 38 specimens (34 ♀, 4 ♂) captured at Kashitu in Rhodesia by the late H. C. Dollman, the antennæ of the males are a little less dilated than usual, one, indeed, having these organs quite slender. *H. formosus*, Harold (1879), type ♀, from Angola, must be very closely related to the present insect; but as the antennæ are stated to have the basal joint reddish beneath, the identification is doubtful. The ♀ of the present species is very like a *Haltica* of the same regions, and it might easily be mistaken for a member of that genus.

44. *Hapalochrus foveiger*, sp. n.

♂. Moderately elongate, rather convex, shining, thickly clothed with rather long, semi-erect, blackish hairs; cyaneous or violaceous, the head and the disc of the prothorax sometimes brassy-black, the abdomen in part red, the antennæ, palpi, and legs wholly black or metallic; head and prothorax sparsely punctured, the latter smooth on the disc; elytra coarsely, closely, uniformly punctate, the punctures deep and separate one from another. Antennæ long, not very stout, subfiliform, joints 2–10 much longer than broad, about equal in width. Prothorax transverse, obliquely narrowed behind, deeply grooved at the base. Elytra moderately long, at the base about as broad as the prothorax, widening to near the apex, the apices broadly, conjointly rounded. Anterior tibiæ thickened at the middle and hollowed thence to the apex; anterior tarsal joints 1 and 2 rather long, subequal in length, 2 narrowly projecting over 3; intermediate femora with a smooth, deep fovea at the base beneath; intermediate tibiæ very stout, convex, deeply excavate at the middle and apex beneath, and with a short, compressed lobe at the inner apical angle.

♀. Antennæ shorter and more slender.

Length $4\frac{4}{5}$–$5\frac{1}{2}$, breadth $2\frac{1}{3}$–$2\frac{2}{5}$ mm. (♂ ♀.)

Hab. E. AFRICA, Serenje in N.E. Rhodesia, alt. 4500 ft. (*S. A. Neave*: 15, 16. xii. 1907: ♂), Kashitu and Mwenga [type] (*H. C. Dollman*: xii. 1914, i. 1915: ♂ ♀).

Seven males and three females. Not unlike a small *H. janthinus*, Fairm., the elytra relatively shorter, more widened posteriorly, and coarsely, closely, uniformly punctate; the intermediate femora of the ♂ deeply foveate at the base beneath. *H. clavicornis* has a somewhat similar, but larger, excavation of the middle femora in the same sex.

45. *Hapalochrus hamatus*, sp. n.

♂. Cyaneous, the head and prothorax brassy or greenish in one specimen, the legs, palpi, and antennæ black or metallic; very shining, the vestiture as in *H. furcatus* (No. 50). Head short, sparsely punctulate; antennæ stout, rather short, serrate, joints 6–9 broad. Prothorax transverse, smooth on the disc, sparsely punctulate near the margins. Elytra depressed on the disc below the base, rather sparsely, somewhat coarsely punctate, with prominent, cariniform lateral margin, the interspaces subplicate. Anterior trochanters armed with a long, hook-like tooth; anterior femora grooved and finely albo-ciliate beneath; anterior tibiæ simply sinuate, compressed towards the apex; anterior tarsal joints 1 and 2 thickened, 2 extending over 3; intermediate femora (Pl. VIII. fig. 26) excavate towards the apex beneath (appearing subangulate at about the middle); intermediate tibiæ (Pl. VIII. fig. 26) moderately thickened, abruptly widening from a little below the base to near the tip, excavate at the middle and apex beneath.

♀. Antennæ much more slender, joints 3–9 longer than broad.

Length $4\frac{1}{10}$–5, breadth $1\frac{9}{10}$–2 mm. (♂ ♀.)

Hab. E. AFRICA, Kashitu in N.W. Rhodesia (*H. C. Dollman*: i. 1915).

Two males and one female are referred to *H. hamatus*, which is extremely like *H. furcatus* from the same locality, and is only separable therefrom by the ♂-characters: the anterior trochanters are strongly hooked and the intermediate tibiæ abruptly, moderately widened from near the base (as in *H. platycerus*, ♂); the anterior tibiæ want the prominent median lobe; the intermediate femora are somewhat deeply emarginate near the apex; and the antennæ are rather broadly dilated, but much less so than in *H. platycerus*.

[To be continued.]

XXXIII.—*On Mammals from the Lower Amazons in the Goeldi Museum, Para.* By OLDFIELD THOMAS.

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As already noted in connection with the description of the new spiny rat, *Lonchothrix emiliæ*, the authorities of the Goeldi Museum, Para, have kindly allowed me the opportunity of examining the series of mammals accumulated by them during the last six years.

As the fauna of this region is still very imperfectly known, I think it useful to give a list of the whole of the specimens and their localities.

The majority of the specimens have been collected by Fräulein Dr. E. Snethlage, and it is to her energy and ability in collecting, and to the enlightened generosity of the Trustees of the Goeldi Museum in the distribution of the specimens, that the greater part of our increased knowledge of Amazonian mammals is due.

A previous paper of the same kind, giving a list of twenty-eight species, was published in 1912[*], while a number of Amazonian novelties received from the Para Museum have been described at various times since 1908.

The regions chiefly concerned in the present series are two—one being in the neighbourhood of Manaos, on the Solimoes or lower Rio Negro, and the other at Villa Braga, on the western bank of the Rio Tapajoz, just above the first rapids. At this latter place Fräulein Snethlage made the most important collection of all—quite a number of new and interesting forms occurring in it.

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[*] Ann. & Mag. Nat. Hist. (8) ix. p. 84 (1912).

Besides Fräulein Snethlage's specimens, the series owes many interesting forms to Senhor F. Lima, one of her keenest and most helpful contributors.

A series of duplicates, and all types, are generously presented to the British Museum by the authorities at Para.

In regard to the present collection, special notice may be directed to the rediscovery of the white-nosed saki (*Pithecia albinasa*), only previously known from the type, described in 1848, and to the numerous interesting novelties contained in it—notably the tuft-tailed spiny rat *Lonchothrix emiliæ* and the whitish bat *Depanycteris isabella*, both of these representing new genera, and to the new marmoset *Hapale emiliæ*, from the Curuá River.

The following list of localities has been given me by Dr. Snethlage:—

Utinga, near Para.—Woods near the waterworks.
Marajó Island.—Fazenda Ilha da Roça and Faz. Pacoval dos Mellos.
R. Flor do Prado, one of the small coastal rivers east of Para.—Quatipurú.
Rio Tocantins.—Fazenda Vaicajó, Cametá.
Rio Iriri, a left affluent of the Xingú.—Sta. Julia and Liberdade.
Rio Curuá, a left affluent of the Iriri—upper waters.
Monte Alegre, north bank of the Amazon nearly opposite Santarem.—Fazenda S. Pedro, Juçaratena.
Taperinha.—A Fazenda on the right bank of the Amazon below Santarem.
Rio Tapajoz.—Villa Braga, left bank, just above the first rapids.
Rio Jamauchim (right affluent of the Tapajoz).—Sta. Helena.
Rio Negro.—Acajutuba, a little above Manaos.
Rio Solimoes.—Manacapurú, a little above the mouth of the Rio Negro.
Ceará.—Ladeira Grande, in the south of the state.—Serra do Castello.

1. *Cebus apella*, L.

♀. 29. R. Iriri (*F. Lima*).

♀. 68, 69. Acajutuba, R. Negro (*E. Snethlage*—as are all specimens not otherwise credited).

♂. 114, 115. Villa Braga, R. Tapajoz.

2. *Pithecia pithecia*, L.

♂. 57, 61; ♀. 58, 59, 60. Acajutuba, Rio Negro.

♀. 62, 63. Manacapurú, R. Solimoes.

3. *Pithecia monachus*, Geoff.

♂. 117; ♀. 118. Villa Braga, Rio Tapajoz.

Villa Braga is on the left (western) bank of the Tapajoz, just above the first rapids.

4. *Pithecia albinasa*, Geoff. & Dev.

♀. 31. Rio Iriri, R. Xingú.

The rediscovery of this well-defined species is of much interest, for it seems never to have been obtained since its original description in 1848, and the type-specimen in Paris has hitherto remained unique. That type was obtained alive from Indians at Santarem.

Fräulein Snethlage's specimen was shot out of a small troup on the banks of the river.

5. *Callicebus hoffmannsi*, Thos.

♂. 119, 120, 121; ♀. 122. Villa Braga, R. Tapajoz.

Only previously known by the type, collected by W. Hoffmanns at Urucurituba, Santarem.

There is considerable variation in the colour of the under surface, two of these specimens having this pale yellowish like the type, while the other two have it strong ochraceous buffy; but the distribution of the buffy or yellowish is the same in all.

6. *Callicebus remulus*, Thos.

♂. 112. Santarem.

Obtained alive by Fräulein Snethlage at Santarem, the original locality more or less doubtful.

Not precisely like true *remulus*, but without a knowledge of the exact locality it is impossible to be sure whether the differences are individual or not.

7. *Aotus trivirgatus*, Humb.

♂. 64; ♀. 66, 67. Manacapurú, Rio Solimoes.

8. *Hapale emiliæ*, sp. n.

♂. 36; ♀. 37. Maloca, Upper Caruá River, Upper Rio Iriri, R. Xingú*.

Near *H. melanurus*, but with white muzzle and no light hip-stripe. General coloration somewhat as in *melanurus*, the shoulders and fore-back silvery grey darkening to rather browner grey on the rump. Hairs of under surface silvery grey. Crown between ears black or blackish, the muzzle in front of the black quite white; cheeks white; chin white, practically naked. Ears large, without tufts, their thin scattered hairs brown. Arms grey, whiter on their inner aspect, hands blackish brown. Legs grey on outer, whiter on inner side, but both aspects more or less suffused with buffy. Feet blackish. Tail black except for its basal inch, which is brownish grey.

"Eyes yellowish brown. Face pink. Ears black at their edges."—*E. S.*

Dimensions of the type (measured in flesh):—

Head and body 199 mm.; tail 308; hind foot 61; ear 29.

Skull: greatest length 44; condylo-basal length 35; zygomatic breadth 29; breadth across orbits 25·5; maxillary tooth-row 11·5.

Hab. as above.

Type. Adult female. B.M. no. 20. 7. 14. 12. Original number 37. Collected 10th November, 1914, by Fräulein E. Snethlage.

This little marmoset, to which Fräulein Snethlage has drawn my special attention, and which I am pleased to name after her, is a member of the *H. argentatus* group, but is readily distinguishable by its white muzzle and the absence of a light hip-stripe from *H. melanurus*, the only species it at all resembles. Of the other species of the group, *H. argentatus* is almost quite white, apart from its black tail, and has no blackish on the head. *H. chrysoleucos* has hairy ears and a pale yellowish tail.—*H. melanoleucos*, Ribeiro, the Para co-type of which is now in the British Museum, is wholly white, its only black being the skin of the face, palms, soles, and scrotum. *H. emiliæ* is therefore evidently a very distinct new species.

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* The Caruá River is marked in Stieler as a tributary of the main Amazon, with its outlet near Santarem; but I prefer to accept Fräulein Snethlage's statement that it is an affluent of the Iriri.

9. *Dasypterus ega*, Gerv.

♂. 9. Monte Alegre, near Santarem (*O. Martins*).

10. *Myotis* sp.

♀. 72. Acajutuba, R. Negro.
♂. 76. Cametá, Tocantins (*F. Lima*).
Probably related to *M. simus*, Thos.

11. *Myotis* sp.

♂. 44, 48, 49; ♀. 45, 50. Ladeira Grande, Ceará (*F. Lima*).

M. nigricans group.

12. *Rhynchonycteris naso*, Wied.

♀. 27. Rio Iriri, R. Xingú.
♀. 70. Acajutuba, R. Negro.

13. *Saccopteryx bilineata*, Temm.

♂. 55; ♀. 56, 57, 58. Ilha da Roça, Marajo (*F. Lima*).
♂. 78, 79; ♀. 77, 80. Cametá, Tocantins (*F. Lima*).

14. *Saccopteryx leptura*, Schr.

♂. 71. Acajutuba, R. Negro.
♀. 129. Villa Braga, R. Tapajoz.

15. *Saccopteryx canescens*, Thos.

♂. 8; ♀. 7. Monte Alegre, near Santarem (*O. Martins*).

16. *Peropteryx canina*, Wied.

♂. 97. Utinga, Para.

17. *Peronymus leucopterus*, Peters.

♂. 81. Cametá, Tocantins (*F. Lima*).

18. *Diclidurus scutatus*, Peters.

♂. 38, 165. Para.

"Caught in the old town."—*E. S.*

These specimens are of great interest, as no example of *D. scutatus* has been recorded since Peters described the species in 1869, and its locality was unknown. The species is evidently quite distinct from *D. albus* by its smaller size and less complicated caudal gland; but without spirit-specimens the differences in this latter respect are not easy to appraise.

The skull agrees with that of *D. albus* in the extension of the palate behind the level of the posterior molars.

19. *Depanycteris isabella*, gen. et sp. n.

♂. 73. Manacapurú, Rio Solimoes (*E. Snethlage*). *Type.*

DEPANYCTERIS, gen. nov.

Allied to *Diclidurus.* Colour pale brown, not white. Ears about as in *Diclidurus;* no trace of the enormous lobe on the tragus found in *Cyttarops.* Thumb not so remarkably abbreviated as in *Diclidurus* and possessing a distinct claw. Hind limbs with the feet markedly longer in proportion to the tibiæ, the distance from the base of the calcar to the tip of the claws more than half the length of the lower leg, while it is decidedly less than half in *Diclidurus.* Groove along inner side of tibia shorter, more open, and less sharply defined. Tail-tip in male without any horny capsule, although there is apparently a structure somewhat similar to that of the *female* of *Diclidurus.*

Skull in most respects similar to that of *Diclidurus*, but the palate is deeply emarginate behind—to the level of the front edge of m^3,—while in front it is also more broadly excavated. Basial pits well defined.

Teeth about as in *Diclidurus.*

Genotype. *D. isabella*, sp. n.

This relative of *Diclidurus* is in general a less highly specialized form than that is, its brownish colour, more normal pollex, and less developed caudal glands all being evidence in this direction. It has no special affinity with *Cyttarops.*

Depanycteris isabella, sp. n.

Size about as in *Diclidurus scutatus.* Colour very similar to that of *Mesophylla macconnelli*, the head and shoulders dull whitish, the back gradually becoming browner, the rump pale "wood-brown." Under surface dull buffy whitish.

Dimensions of the type (the starred measurements taken in the flesh):—

Forearm (approximately) 54 mm.

Head and body* 62; tail* 121; hind foot* 11; ear* 12. Tragus on inner edge 4, breadth 2·8. Third finger, metacarpus 56, first phalanx 10; tibia 19, hind foot (c. u.) 9; calcar 16

Skull: greatest length (occiput to base of canines) 16; basi-sinual length 11·6; zygomatic breadth 11·5; breadth across orbits 8; mastoid breadth 9·2; palato-sinual length 3·7; front of p^4 to back of m^3 5.

Hab. as above.

Type. Adult male (softened and placed in spirit). B.M. no. 20. 7. 14. 24. Original number 73. Collected 17th October, 1916, by Fräulein E. Snethlage.

This new bat forms a most interesting discovery, adding a third genus to the small subfamily Diclidurinæ. It is in all respects less highly specialized than *Diclidurus*, the well-known white bat of the Neotropical region, which, until the discovery of *Cyttarops* in 1913 †, was supposed to be entirely isolated from all its allies. In colour the white *Diclidurus* remains unique, for both *Cyttarops* and *Depanycteris* are brown, though the latter is an unusually pale brown.

20. *Noctilio leporinus*, L.

♂. 51; ♀. 52, 53, 54. Ladeira Grande, Ceará (*F. Lima*).

All with well-marked dorsal streaks. No. 52 is strongly fulvous both above and below; the others are brown above and whitish below.

21. *Dirias albiventer*, Spix.

♂. 59; ♀. 60, 61, 62. Ilha da Roça, Marajó (*F. Lima*).

The same variation in the colours occurs as with the *Noctilio*, and is equally independent of sex.

Mr. Osgood's observations ‡ about the teeth of *Noctilio* and *Dirias* and the uselessness of the dental characters for distinguishing the two genera are undoubtedly quite correct, as I have verified by the examination of many forms of both groups. But I am none the less disposed to consider that the striking difference in the proportions of the legs and feet renders the retention of Miller's genus *Dirias* advisable. No intermediates occur, and I have seen a small *Noctilio*, with skull scarcely larger than that of a large *Dirias*, showing the fully developed *Noctilio* feet, so that the diminution in the size of the feet does not go *pari passu* with that of the animal as a whole.

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† Ann. & Mag. Nat. Hist. (8) xi. p. 134 (1913).

‡ Field Mus. Publ. x. no. 4, p. 31 (1910).

22. *Dirias irex*, sp. n.

♂. 26, 28. Santa Julia, Rio Iriri, Rio Xingú.

General characters as usual, but size less than in any known form. Colour of type dull brown above, buffy whitish below; paratype wholly fulvous.

Dimensions of type:—

Forearm 53 mm.

Head and body 65; tail 12; ear 22. Third finger, metacarpal 47, first phalanx 12; lower leg and hind foot (c. u.) 33.

Skull: greatest length 18; condylo-basal length 16; condyle to front of canine 15·7; zygomatic breadth 13·4; breadth of brain-case 11; palatal length 8·6; front of canine to back of m^3 7.

Hab. as above.

Type. Adult male. B.M. no. 20. 7. 14. 29. Original number 26. Collected 13th February, 1914, by Fräulein E. Snethlage.

This *Dirias* is markedly smaller than any member of the genus hitherto known, its small size coming out especially in the length of the tooth-row. *Dirias minor*, Osg.*, supposed by him to be unusually small, appears from the measurements to be of about the size of the majority of our Amazonian specimens, some few only being larger. The two specimens of *D. irex* agree precisely in the size of the teeth, but the paratype is even smaller than the type in other respects.

23. *Molossus rufus*, Geoff.

♂. 48, 53; ♀. 49, 50, 51, 52. Conceição, Rio Moju, near Para.

24. *Molossus obscurus*, Geoff.

♂. 75; ♀. 76, 77. Acajutuba, Rio Negro.
♀. 131. Villa Braga, R. Tapajoz.

25. *Tadarida macrotis*, Gray.

♂. 33; ♀. 32. Rio Iriri, Rio Xingú.

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* *Noctilio minor*, Osgood, *l. c.*

26. *Trachops cirrhosus*, Spix.

♂. 11; ♀. 10. Monte Alegre.

27. *Phyllostomus hastatus*, Pall.

♂. 43, 44; ♀. 42, 45, 46, 47. Conceição, Rio Moju.

28. *Hemiderma perspicillatum*, L.

♂. 41. Conceição, R. Moju, near Para.

29. *Glossophaga soricina*, Pall.

♂. 40. Cerro do Castillo, Ceará (*F. Lima*).
♂. 130. Villa Braga, R. Tapajoz.

30. *Vampyrodes caraccioli*, Thos.

♂. 113. Utinga, Para.

A very interesting capture, as no specimen of *V. caraccioli* has been obtained, so far as I am aware, since I described the type from Trinidad in 1900. The present specimen is fully adult while the type was rather immature, but with the exception of its resultant slightly greater size there is nothing to distinguish the Para from the Trinidad example.

The skull is 26 mm. in total length, the forearm 51.

31. *Chiroderma villosum*, Pet.

♂. 24. S. Antonio do Prata.

32. *Sturnira lilium*, Geoff.

♂. 74. Manacapurú, R. Solimoes.
♂. 98; ♀. 99, 100, 101. Flor do Pardo, Quatipuru.

33. *Sciurus pyrrhonotus*, Wagn.

♂. S. 84. Manacapurú on the Solimoes, near mouth of Rio Negro (normal coloration).

♂. S. 79, 81, 82, 83; ♀. 80. Acajutuba, Rio Negro, near its mouth.

♂. S. 132. Villa Braga, Rio Tapajoz.

♀. Upper Jurua (?).

Of the five specimens from Acajutuba, four are wholly black, and it was no doubt one such that Wagner referred to his *S. igniventris*, but the normal-coloured specimen, which is precisely like No. 84 from Manacupurú, indicates that the Lower Rio Negro form should really be assigned to *pyrrhonotus*.

The capture of a specimen at Villa Braga extends the known range of these giant squirrels eastwards from the Madeira to the Tapajoz basin.

34. *Sciurus æstuans paraensis*, Goeldi.

4 ♂. 102, 103, 104, 105. Flor do Prado, Quatipuru, Coast E. of Para.
♂ ♀. L. 82, 83. Cametá, Tocantins (*F. Lima*).
♂. M. 5. Tanaquara (*O. Martins*).
♀. S. 135. Rio Jamauchim.
2 ♀. S. 133, 134. Villa Braga, Tapajos.
♀. S. 25. R. Iriri, R. Xingú.
♀. L. 35. Serra do Castillo, Ceará (*F. Lima*).

It is at present impossible to make a satisfactory determination of every one of these squirrels, which show a wide range of colour-variation, especially in the amount and intensity of the buffy of the under surface. The name *paraensis* seems to be the best to use provisionally for them until they have again been revised with much further material.

35. *Microsciurus manarius*, sp. n.

♂. 85, 86. Acajutuba, Rio Negro, near its mouth.

An olive species with buffy ear-patches. No p^3 in either of the two specimens.

Fur short and close. General colour above olive-brown, warmer and more buffy on the face and crown. Under surface buffy, of medium richness. Ears with their inner surface and the upper third of their outer surface (proectote) deep ochraceous buffy; lower two-thirds of outer surface and patch behind them paler buffy. Eye-rims buffy. Hands and feet greyish olivaceous. Tail long, narrow, its hairs deep reddish tawny basally, this colour making a median line along the lower surface, black subterminally, and pale buffy at tips; the long hairs at the end of the tail tipped with tawny.

Skull of about the size and shape of that of *M. rubrirostris*, Allen; narrower and with less widely expanded zygomata than that of *M. flaviventer*, Gray.

Small upper premolar (p^3), whose presence is supposed to be characteristic of *Microsciurus*, absent in both specimens.

Dimensions of the type:—

Head and body 127 mm.; tail 129; hind foot 38; ear 16.

Skull: greatest length 36·3; condylo-incisive length 32;

zygomatic breadth 21·7; nasals 9·2; interorbital breadth 13; palatilar length 15; upper tooth-series 5·9.

Hab. as above.

Type. Adult male. B.M. no. 20. 7. 1. 8. Original number S. 86. Collected 21st February, 1916.

This squirrel appears to be most closely related to *M. flaviventer*, Gray, of which, besides the type, the Museum possesses a specimen from the Yahuas Territory, north of Loreto, N.E. Peru. It differs as a species by its paler general colour, its reddish ears, and its narrower and more lightly built skull.

But it also presents a puzzle as to the characters of the genus *Microsciurus*, for with the small size and other external characteristics of the genus it has no p^3, and might therefore be thought referable to the group of *Sciurus* called *Leptosciurus* by Allen. But in *M. flaviventer* p^3 is proportionally much smaller than is usual in *Microsciurus*, and I am disposed to believe that the present is a species which has gone just one stage further in the same direction, unless these two specimens prove hereafter to be abnormal individuals without the tooth, as occasionally happens. In all other respects the species is a typical *Microsciurus*.

36. *Sciurillus pusillus*, Desm.

♀. 137; ♀. 136. Villa Braga, Rio Tapajos (*E. Snethlage*).

Quite like the type of *Macroxus kuhli*, Gray, which very likely came from this region, and not from Guiana, where alone *Sciurillus* has hitherto been supposed to be found.

37. *Holochilus sciureus*, Wagn.

♂. 55, 111. Para.

38. *Oryzomys laticeps*, Lund.

♂. 140. ♀. 139, 141. Villa Braga, R. Tapajoz.
♀. 34. Liberdade, Rio Iriri, R. Xingú.

39. *Oryzomys subflavus*, Wagn.

♂. L. 43. Ladeira Grande, Ceará (*F. Lima*).

40. *Oryzomys navus messorius*, Thos.

♂. L. 28, 29, 30; ♀. 31. Fazenda Pacoval dos Mellos, Marajo Island (*F. Lima*).

41. *Œcomys tapajinus*, Thos.

♂. S. 22, 23. Island of Marajo.
♂. S. 138. Villa Braga, R. Tapajoz.
♂. S. 87. Manacapurú, R. Solimoes.
♀. M. 20. Monte Alegre, near Santarem (*O. Martins*).

42. *Proechimys goeldii*, Thos.

♂. S. 92; ♀. 90, 91. Acajutuba, Rio Negro.
♂. 94, 95; ♀. 93. Manacapurú, R. Solimoes.

Five molar laminæ are frequently, if not invariably, present among these specimens.

43. *Cercomys laurentius*, Thos.

♂. L. 42. Serra do Castello, Ceará (*F. Lima*).

44. *Echimys armatus*, Geoff.

♂. 144, 145. Villa Braga, R. Tapajoz.

45. *Lonchothrix emiliæ*, Thos.

Suprà, p. 114.

♂. 142. Villa Braga, R. Tapajoz. *Type.* (B.M. no. 20. 6. 4. 1.)

This remarkable animal, the prize of the collection, has already been described, but I include it here to make the list complete.

46. *Isothrix bistriata negrensis*, subsp. n.

♀. 89. Acajutuba, Lower Rio Negro, near its mouth.

Nearly allied to *I. b. orinoci*, and agreeing with it, as contrasted with true *bistriata*, in the presence of marked light postauricular patches and the shortening of the median light crown-patch, which ends opposite the middle of the ears instead of being continued down the nape; the nape is therefore blackish all across instead of being divided in the centre. Differing from *orinoci* by the general colour being strongly suffused with ochraceous, the rump much more ochraceous than the body, the ear-patches buffy instead of whitish, the median crown-patch distinct and buffy instead of being whitish and only vaguely indicated, and by the under surface being strong ochraceous buffy throughout. Tail with the basal two-fifths dull ochraceous instead of a quarter or less.

Skull quite as in *bistriata* and *orinoci*.

Dimensions of the type:—

Head and body 244 mm.; tail 253; hind foot 41; ear 19.

Skull: greatest length 56; condylo-incisive length 51; zygomatic breadth 28·5; nasals 17; interorbital breadth 13·8; upper tooth-series 11·5.

Hab. as above.

Type. Adult female. B.M. no. 20. 7. 1. 20. Original number 89. Collected 1916 by Dr. E. Snethlage.

Animals agreeing with *E. bistriata* in all important characters, external and cranial, are found over the huge area extending from the Rio Guaporé, about 13° S. to the middle Orinoco in 5° N., and westwards to the Ucayali in 75° W., the present locality being about the eastern centre of the area. No doubt the extremes, *bistriata* and *orinoci*, might be thought to be specifically separable by their colour-characters, but their skulls are so identical that I have preferred to keep them under one specific heading. The new form is most allied to *orinoci*, but differs by the characters detailed above.

Natterer's second specimen, mentioned by Pelzeln but not by Wagner, was no doubt, from its locality, an example of *I. b. negrensis.*

47. *Dactylomys* sp.

♂. Taperinha, Santarem (*Dr. Hagmann*).

Probably *D. dactylinus canescens*, but in faded pelage and without skull.

48. *Coendou prehensilis*, L.

♂. 150 (young). Villa Braga, R. Tapajoz.

Two further young Coendous are also included in the collection, both of them albinistic. Owing to their youth and abnormal coloration they cannot at present be determined with any certainty.

More material of this genus is very much needed, as the skulls are so remarkably variable that satisfactory results can only be attained by the help of good series.

49. *Dasyprocta aguti*, L.

♂. 151. Villa Braga, R. Tapajoz.

50. *Myoprocta acouchy*, Erxl.

♂. M. 18, M. 19. Montalegre, Juçaratena, N. bank of Amazon nearly opposite Santarem.

These specimens are unusually red, having less black on the hinder back than is usual.

Dasyprocta exilis, Wagl., and *D. leptura*, Wagn., would both seem to be referable to this animal, for I find it quite impossible to accept Dr. Allen's identification * of the former with one of the greenish-coloured *pratti* group, merely because there was a white line down the belly of the type. *D. exilis* was described as "*notæo toto castaneo-fuscescente*," a coloration absolutely in contrast with that of *pratti*, while characteristic of the present form. And *D. leptura* is also "*ferrugineo-rufa*." In consequence, the next species may be considered without reference to those names.

51. *Myoprocta pratti limanus*, subsp. n.

♂. 96. Acajutuba, near mouth of Rio Negro, above Manaos. B.M. no. 20. 7. 1. 24. *Type*.

Colours throughout more vivid than in true *pratti*. Face and crown strongly suffused with ochraceous. Nape-streaks bright ochraceous buffy. Under surface bright yellowish buffy, the chest-hairs buffy to the roots, the belly—apart from the well-developed white median line—wholly buffy, the line of demarcation on sides not sharply marked, as it is in *M. p. milleri*. Chin whitish, almost naked. No trace of the broad brownish slaty bases to the throat-hairs so marked in *milleri*. Inner surface of thighs bright "light orange-yellow." Upper surface of hands and feet dark grizzled tawny.

Skull about as in *pratti*, but the bullæ markedly smaller.

Dimensions of the type:—

Head and body 337 mm.; tail 49; hind foot 86; ear 31.

Skull: greatest length 76·5; condylo-incisive length 66; zygomatic breadth 38; bulla, length on a line parallel with the median axis of the skull 13; upper tooth-series 12·3.

Hab. and *type* as above, the latter collected 9th June, 1916, by Fräulein E. Snethlage.

There would seem to be three subspecies of the greenish acouchy, the true *Myoprocta pratti* of the Marañon of Peru †, with the yellowish of the belly quite narrow, its breadth at most 2 inches, and with comparatively large bullæ; secondly, the form found in Colombia—*M. p. milleri*, Allen,—with broad, sharply defined yellowish belly, the hairs of the throat dark at base, and the nuchal streaks not strongly developed;

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* Bull. Am. Mus. xxxv. p. 205 (1916).

† Mr. Pocock did not record the exact locality, but I have been able to learn from Mr. Pratt that the agoutis were obtained at the Pongo de Rentema, on the Marañon, about 78° 20′ W.

and, thirdly, the present form, which represents a considerable extension eastwards of the range of this type of agouti.

As already stated, I feel quite confident that this animal is not Wagler's *D. exilis*, as suggested by Allen, and therefore now give it a new subspecific name.

At Fräulein Snethlage's suggestion I name this well-marked form in honour of her helper and contributor Senhor F. Lima, to whom the Goeldi Museum is indebted for many interesting mammals.

52. *Cyclopes didactylus*, L.

♀. 152, 153. Villa Braga, R. Tapajoz.

53. *Marmosa domina*, sp. n.

♂. 160; ♀. 156, 157, 159 (young). Villa Braga, R. Tapajoz.

M. cinerea group; tail wholly brown.

Fur not very long, hairs of back about 10 mm. in length. General colour drabby grey, the sides becoming greyish drab. Under surface not sharply defined, buffy, the chest and inguinal region clear buffy, the belly-hairs slaty at base except along the middle line. Furry portion at base of tail not very extended, only about an inch in length, and its hairs not long, about 5–6 mm. Rest of tail naked, brown to the tip, not whitened terminally.

Skull, as usual in this group, with well-marked triangular postorbital processes.

Dimensions of the type:—

Head and body 166 mm.; tail 250; hind foot 24·5; ear 27.

Skull: upper length 45; condylo-basal length 44·5; zygomatic breadth 25; nasals 20 × 6; interorbital breadth 7·5; breadth across postorbital processes 8·4; palatal length 24·8; breadth across outer corners of m^2 13·8; maxillary tooth-row 18·5; three anterior molariform teeth 7·2.

Hab. as above.

Type. Adult female (basilar suture closed). B.M. no. 20. 7. 14. 39. Original number 156. Collected 19th June, 1917, by Fräulein Snethlage.

Only two members of this group are without white on the tail-tip—*M. germana* of Ecuador, which has a more or less greyish-brown belly, and *M. regina* of Colombia, larger and more buffy throughout. *M. cinerea demeraræ* of Guiana has but little caudal white, and may be the nearest ally of the present form, but its tail has a considerably longer furry portion at its base.

54. *Marmosa collega*, sp. n.

♂. 154. Villa Braga, Rio Tapajoz.

A large species of the *incana* group; furry part of tail about an inch in length.

Size rather larger than in *incana*. Fur of moderate length, hairs of back about 7 mm. in length. General colour above dull cinnamon, about as in *M. murina*. Under surface and inner side of limbs dull creamy white, the whitish area narrowed on the belly, where it is about an inch in breadth. Black orbital rings well marked. Hands and feet whitish. Tail-base furry for about an inch, though the fur there is only about 4–5 mm. in length; rest of tail naked, brown, with fine and inconspicuous white marblings throughout its length, but these are probably often absent.

Skull long, narrow, more strongly built than in *incana*, with well-marked parallel beads along the supraorbital edges, not projected outwards into ledges. Teeth proportionally small.

Dimensions of the type:—

Head and body 148 mm.; tail 204; hind foot 21; ear 22.

Skull: greatest length 40·5; condylo-basal length 40·2; zygomatic breadth 20·7; nasals 19·3 × 4·7; interorbital breadth 7; breadth across supraorbital beads 7·1; palatal length 23; breadth across outer corners of m^2 11·4; maxillary tooth-row 16·3; length of three anterior molariform teeth[*] 6·4.

Hab. as above.

Type. Old male. B.M. no. 20. 7. 14. 40. Original number 154. Collected 7th June, 1917, by Fräulein Snethlage.

This species belongs to the *incana* group, which does not have triangular postorbital processes projecting over the orbits. It is larger and more brown-coloured than *M. incana*, and has a longer furry base to its tail. This latter character also proves its distinctness from *M. madeirensis*, Cabr., a renaming of Wagner's *Didelphys macrotarsus*.

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[*] *I. e.*, p^4, m^1, and m^2, not mp^3, p^4, and m^1 as Dr. Cabrera seems to have taken when describing his type of *Marmosa polita*, which is not adult, but still retains its milk p^4. This is clearly shown by the excellent figure he gives.

The hairs of the sides of the neck of the type of *M. collega* are stiffened and show evidence of some glandular modification.

55. *Marmosa limæ*, sp. n.

♀. 85. Ceará (*F. Lima*).

Allied to *M. collega*, but fur longer, colour greyer, and teeth larger.

Size rather less than in *collega*. Fur long, soft and woolly, the hairs of the back about 11 mm. in length. General colour above strong drabby grey, the back nearly "drab," the sides more buffy brown. Under surface deep soiled buffy, the bases of all the hairs, except on chin and inguinal region, slaty greyish, their tips ochraceous buffy; cheeks and interramia cinnamon-tawny, inguinal region cinnamon-buff. Tail with quite an inch and a half furry, the hairs about 8 mm. in length; rest of tail brown, with a few conspicuous whitish marblings terminally.

Skull very like that of *M. collega*, with similar but less heavy supraorbital beads. Molars rather larger.

Dimensions of the type:—

Head and body 135 mm.; tail 225; hind foot 25; ear 27.

Skull: greatest length 40; condylo-basal length 39·3; zygomatic breadth 20; nasals 16·7 × 4·5; interorbital breadth 5·8; breadth on supraorbital beads 6; palatal length 22·5; breadth across outer corners of m^2 17·7; maxillary tooth-row 16·5, three anterior molariform teeth 7·2.

Hab. Ceará.

Type. Adult but not old male. B.M. no. 20. 7. 14. 41. Original number 85. Lived for some months in the Para Zoological Gardens, to which it was brought from Ceará by Senhor F. Lima. Died 11th March, 1916.

This is a very striking species owing to the strong buffy coloration of the under surface, the long woolly fur, and the considerable extent of the furry base of the tail, so that it looks like a small member of the *cinerea* group. But in a fully adult specimen, with permanent dentition, its narrow skull and parallel supraorbital beads show that it is really an ally of the Tapajoz species just described. It is named after its captor, Senhor F. Lima.

56. *Marmosa parata*, Thos.

♀ and 2 young. 11, 12, and 18. Para Zoological Gardens.

Described in 1911 from a specimen obtained at Igarapé-Assu by Mr. A. Robert.

Specimens nos. 155, from Villa Braga, and 39 and 41, from Ceará, are also allied, but show certain differences, for whose due appreciation further material is required.

57. *Monodelphis* * *brevicaudata*, Erxl.

♂. Taperinha, near Santarem (*Dr. Hagmann*).

58. *Monodelphis emiliæ*, Thos.

Peramys emiliæ, Thos.

♂. 161, 162. Villa Braga, R. Tapajoz.

These two excellent specimens of this rare and beautiful opossum are of interest owing to their again showing the curious vinaceous coloration of the under surface on which some notes were given in the original description (*l. c.*). Both examples are old males and have the coloration covering nearly the whole of the under surface, quite uniformly, and similar in each case. It is, perhaps, possible that this colour, so unlike a normal mammal colour, may be due to a staining by some external cause, say a purple-juiced bark, and the rapid change in the colour after death recorded by Fräulein Snethlage would be in favour of such a view.

Whether natural or artificial, it probably increases with age, as both these examples are quite old, and have it at a maximum.

XXXIV.—*Notes on some Parasitic Worms from East Africa.* By H. A. Baylis, M.A.

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The five species to be considered formed part of a collection of parasites made by Mr. A. Loveridge during 1917–1919 in British, and what was formerly German, East Africa.

NEMATODA.

1. *Ascaridia fasciata*, sp. n. (Figs. 1–3.)

Host: *Vinago delalandii*, subsp.
Locality. Dar-es-Salaam.

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* *Cf.* Ann. & Mag. Nat. Hist. (9) v. p. 195 (footnote).

This form is very closely related to *Ascaridia* [*Heterakis*] *longecirrata* (v. Linstow, 1879 *), the host of which was also a dove, *Geopelia* sp. v. Linstow's very brief description, however, mentions only nine pairs of caudal papillæ in the male, whereas the present form shows thirteen pairs (see below). The relative length of the œsophagus is also less than in v. Linstow's species.

The male measures up to 43 mm. in length and 1 mm. in thickness, the female up to 71 mm. and 1·9 mm. respectively. The anterior end is usually curled towards the dorsal side.

Fig. 1.

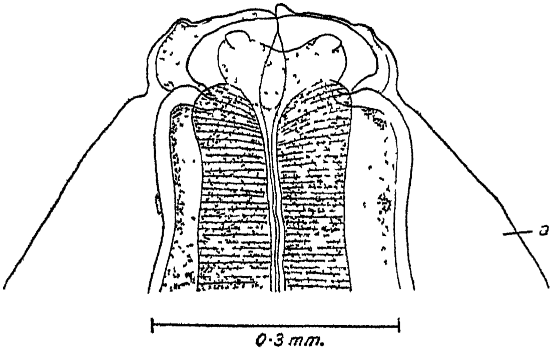
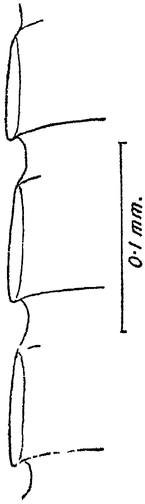


Fig. 2.



Ascaridia fasciata.

Fig. 1.—Head of male; dorsal view. *a*, cervical ala.
Fig. 2.—Portion of cuticle in optical longitudinal section, showing the annular thickenings.

The tail is straight, and tapers to a fine point in both sexes. There are three large lips of semicircular outline, the dorsal lip (fig. 1) bearing two large papillæ, the ventro-lateral lips each a single median papilla. The diameter of the head is 0·3–0·48 mm. The cuticle is marked with thickened transverse rings (fig. 2), which can hardly be called striations (*cf.* v. Linstow's account of *H. longecirrata*). In the middle of the body they attain a maximum width (measured from the posterior limit of one ring to the posterior limit of the next) of 0·1 mm.

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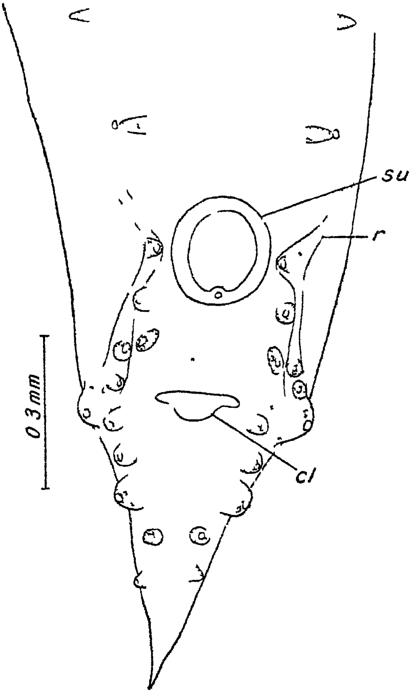
* Arch. f. Naturg. p. 175, pl. xi. fig. 23.

The anterior end of the worm is provided with well-developed lateral alæ (fig. 1, *a.*), attaining a width of 0·3 mm. or more at the widest part, which is at about 1·4 mm. from the anterior extremity, and extending backward for from 3 to 4 mm. The œsophagus is simple and short, shaped like a slender Indian club, and measuring 2·4–3·7 mm. in length, or roughly $\frac{1}{20}$ of the total length. The nerve-ring is situated at 0·7–0·9 mm., and the excretory pore at 0·85–1·0 mm., from the anterior extremity. "Internal vesicles" (*cf. Ascaridia maculosa*) are seen within the body-wall, some of them being very large (up to 0·4 mm. in diameter).

Fig. 3.



Ascaridia fasciata. Caudal end of male; ventral view. *cl.*, cloaca; *r.*, lateral cuticular ridge; *su*, sucker.

In the male the tail (fig. 3) is 0·7 mm. long. The spicules are of equal length (1·9 mm.), and are alate, measuring about 0·07 mm. in width. There are thirteen pairs of caudal papillæ—five postanal, one large adanal, and seven preanal. The preanal sucker (fig. 3, *su.*) measures 0·25 mm. in diameter. The body is somewhat compressed laterally in the region of the sucker, and the cuticle raised ventrally into two longitudinal ridges (fig. 3, *r.*) at the sides of the sucker. These ridges perhaps represent caudal alæ.

In the female the tail is 1·25–1·6 mm. long. The vulva is situated very slightly in front of the middle of the body. The vagina and unpaired portion of the uterus are short, and together form a tube which runs forward in a sinuous course for about 2 mm., before giving off at right angles the two uterine branches, which run perfectly straight forward and backward respectively. The ova are of oblong-oval shape, with a thick shell, and measure 88 μ × 45 μ.

2. *Subulura loveridgei*, sp. n. (Fig. 4.)

Host: (?) *Mungos* [*Crossarchus*] *fasciatus*.
Locality. (?) Morogoro.

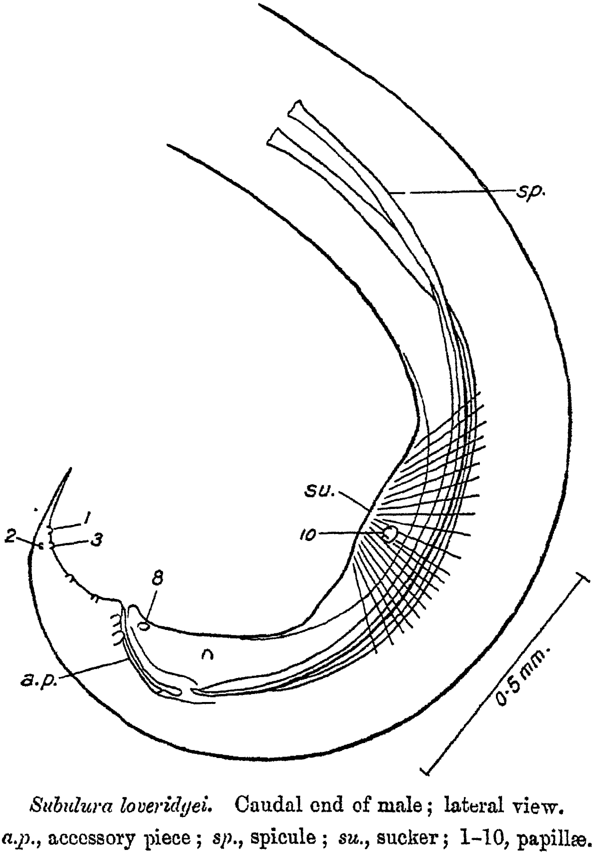
This is a slender little worm, which occurred in very large numbers. The identification of the host, unfortunately, is somewhat doubtful, owing to the loss of the collector's label, but Mr. Loveridge believes that it was that named above. A species of *Subulura* is already known from a clos ly-related host (*S. schebeni*, v. Linst., from *Cynictis penicillata*), but the present species is considerably larger.

The largest specimens measure: male 19 mm. long and 0·52 mm. thick, female 29·7 mm. long and 0·65 mm. thick. There are no cervical alæ. The œsophagus, including the posterior bulb, measures 1·75 mm. in length from the anterior extremity in the male, and 2·15 mm. in the female. The bulb is distinctly marked off by a constriction, contains a chitinous denticular apparatus, and measures 0·3–0·35 mm. in length. The nerve-ring is situated at 0·35 mm. from the head-end in both sexes, and the excretory pore at 0·625–0·65 mm.

In the male the caudal end (fig. 4) is provided with a rudimentary preanal sucker (fig. 4, *su.*). The tail itself measures 0·37 mm. in length. There are ten pairs of papillæ, of which seven are postanal. The second and seventh pairs are situated more laterally than the rest. The two equal spicules (fig. 4, *sp.*) measure 1·55 mm. in length. At the proximal end they are simple and tubular, but at about

0·4 mm. from the base the tubular portion is suddenly narrowed to form a supporting rib along the dorsal edge, while the ventral edge is produced into a flange. There is an accessory piece (fig. 4, *a.p.*) measuring 0·23 mm. in length. The extremity of the tail is produced into a very fine tapering filament.

Fig. 4.



Subulura loveridgei. Caudal end of male; lateral view.
a.p., accessory piece; *sp.*, spicule; *su.*, sucker; 1–10, papillæ.

In the female the tail, which is 1·7 mm. long, tapers gradually from the anus to a fine point. The vulva is situated considerably in front of the middle of the body, at 11·9 mm. from the head-end. There is an ovejector like that of *S. allodapa* and *S. forcipata*, as described and figured by

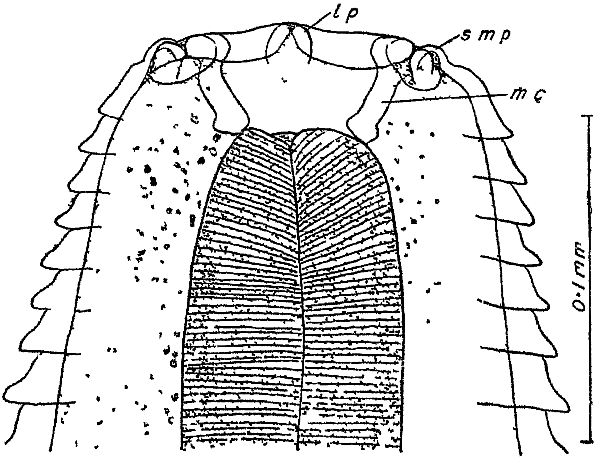
Seurat *. The ovejector itself measures 0·65 mm. from the vulva in a forward direction, ending anteriorly in an oval chamber into which the vagina opens dorsally by a narrow canal with thick walls. At a point 0·95 mm. from the vulva the vagina bends back upon itself towards the posterior end. The precise course of the uteri has not been traced, but they appear to run back nearly as far as the anus, and then turn forward again, the most anterior coils extending to within 1·6 mm. of the œsophageal bulb. The ova contain coiled embryos, and measure 75 $\mu \times$ 62·5 μ.

3. *Thelazia depressa*, sp. n. (Figs. 5–7.)

Host: (?) *Mungos* [*Crossarchus*] *fasciatus*.
Locality. (?) Morogoro.

In the same tube with the numerous specimens of *Subulura* just described there occurred a pair, male and female, of a form which appears to belong to the genus *Thelazia*. The usual habitat of the worms of this genus is the orbital region of birds and, more rarely, of mammals. It is possible that

Fig. 5.



Thelazia depressa. Head of female; lateral view.
l.p., lateral papilla; *m.c.*, wall of mouth-capsule; *s.m.p.*, submedian papilla.

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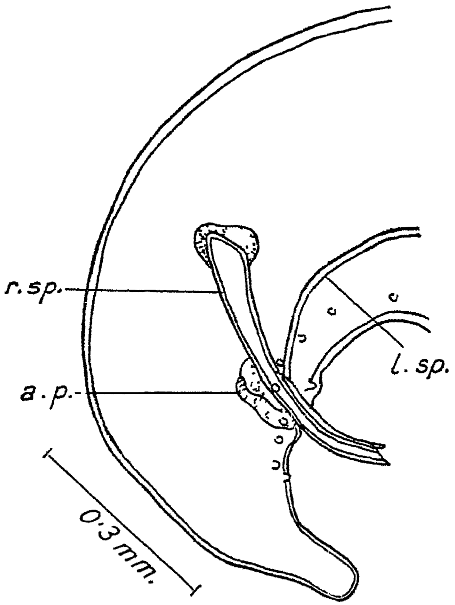
* C. R. Soc. Biol. Paris, ii. (1914) p. 154, figs. 2, 4.

the present case is one of pseudo-parasitism, the actual host having been some bird or other animal upon which the mongoose had just been feeding when it was killed. The worms are fairly well preserved, though the cuticle of the male has been ruptured in one place.

The total length is about 14 mm. in the male and 21 mm. in the female. The body, especially anteriorly, is flattened dorso-ventrally. The maximum thickness (from side to side) is 1 mm. There are pronounced transverse cuticular rings, with very prominent posterior edges. They are especially well-marked on the anterior portion of the body, where they are 25–35 μ in width (antero-posteriorly). Towards the tail they gradually become narrower and less prominent.

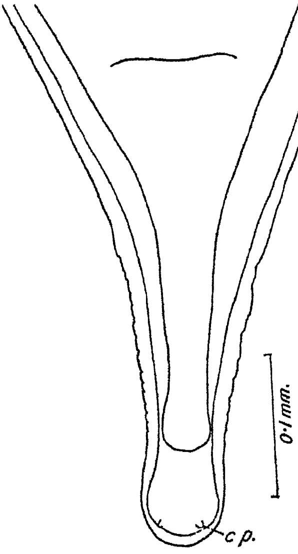
Fig. 6.



Thelazia depressa. Caudal end of male; lateral view.
a.p., accessory piece; *l.sp.*, left spicule; *r.sp.*, right spicule.

There is a wide and shallow mouth-capsule with very thick cuticular walls (fig. 5, *m.c.*), but without teeth. It measures 0·04 mm. in depth and 0·05–0·06 mm. in width. The mouth is surrounded by papillæ, of which two are lateral (fig. 5, *l.p.*) and four submedian (fig. 5, *s.m.p.*), the latter being apparently double papillæ. The terminations of the papillæ are at the bases of small funnel-like cuticular depressions. The œsophagus is simple, increasing slightly in diameter posteriorly, and both it and the anterior part of the intestine are very slender. The length of the œsophagus is 1·2 mm. in the male and 1·3 mm. in the female. There is a pair of very prominent lateral neck-papillæ situated at about half the length of the œsophagus from the anterior end. The nerve-ring surrounds the œsophagus at 0·5 mm. from the head-end. No excretory pore has been detected.

Fig. 7.



Thelazia depressa. Tail of female; ventral view.
c.p., caudal papilla.

The tail, in both sexes, ends bluntly in a slight knob-like swelling, which is most pronounced in the female. The caudal end of the male (fig. 6) is curved towards the ventral side, and the tail itself measures 0·3 mm. in length. There are no caudal alæ. The caudal papillæ are small; there are about fifteen pairs—four postanal (close together), one pair adanal, and about ten preanal, in a regular series. Immediately in front of the cloaca there is an unpaired ventral papilla. Two very unequal spicules (fig. 6, *l.sp.*, *r.sp.*) and an accessory piece (fig. 6, *a.p.*) are present. The left spicule measures 2·7 mm. in length, and is very slender. The right spicule is much stouter, but measures only 0·5 mm. in length. The latter is alate for the distal half.

In the female the tail (fig. 7) is 0·35 mm. long and is quite straight. On the ventral surface, close to the tip, it bears a pair of minute papillæ. The vulva is situated in the œsophageal region, just behind the neck-papillæ. The vagina runs posteriorly as a narrow tube for some distance. The two uteri run posteriorly in parallel coils. They are wide and thin-walled tubes, containing large numbers of fully-formed embryos, closely coiled together, and apparently not enclosed in egg-shells. The species is therefore apparently viviparous. The coils of the ovaries extend back to within 3·5 mm. of the anus.

CESTODA.

4. *Oochoristica zonuri*, Baylis, 1919.

Host: *Zonurus tropidosternum.*

Locality. Dodoma.

The original specimens of this form * came from the same host-species, from Portuguese East Africa. The present specimens do not differ sufficiently from the type to be regarded as a distinct species, but there are certain discrepancies which indicate that the species *O. zonuri* is a somewhat variable one. In size the present material is distinctly smaller than the type, the longest complete specimen not exceeding 80 mm. in length, while the greatest width is about 2 mm. The worms are less contracted in an antero-posterior direction, and show a considerable unsegmented neck behind the scolex. The scolex itself is slightly larger (about 1·1 mm. in diameter). The suckers also are a little larger (0·55 × 0·4 mm.). The most posterior segments are longer than broad. The number of testes appears to be from eighty to ninety, instead of sixty to seventy, as in the type.

The measurements given in the key to certain species of *Oochoristica* from lizards, in my former paper, should, of course, be regarded as a rough guide only, and were intended as such. It is clear that such measurements must be of relatively small value in the case of cestodes, which are liable to exhibit great variations due to different states of contraction.

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* 'Parasitology,' xi. (1919) p. 406.

5. *Oochoristica crassiceps*, sp. n. (Figs. 8 and 9.)

Host: *Psammophis subtæniatus.*

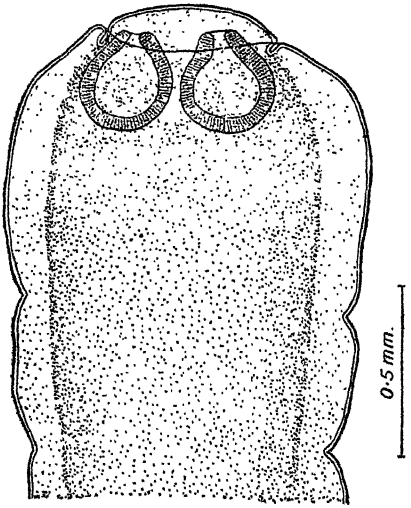
Locality. Mombasa.

The material consists of two specimens. The larger of these measures about 3 cm. in length. Portions of the smaller individual have been used for the preparation of sections, but it is impossible at present to give a very complete account of the anatomy.

External Features.

The scolex (fig. 8) measures 1·0–1·1 mm. in width. A rudimentary rostellum is present, measuring 0·5 mm. in transverse diameter. The suckers, of which two are situated on the dorsal and two on the ventral surface, are sunk into the substance of the scolex, and their apertures are anterior. Their outside measurements are 0·3 mm. antero-posteriorly and 0·25 mm. transversely. The strobila is widest towards the anterior end, where it attains a maximum width of 1·3 mm. Posteriorly it tapers gradually down to 0·65 mm. in the last segment.

Fig. 8.



Oochoristica crassiceps. The scolex.

The cuticle is less wrinkled than is usual in the genus, and there is little external sign of segmentation, the intersegmental divisions being marked only by a slight constriction. There is no sign of segmentation at all for about 2·5 mm. from the anterior end. This unsegmented "neck" measures 0·9 mm. across at the narrowest part. Behind this about one hundred segments can be counted, but the more anterior of them are very ill-defined. The youngest segments are much broader than long. Mature and early gravid segments are about twice as broad as long, while posteriorly the length gradually increases in proportion to the breadth, the last three or four segments being longer than broad.

The genital pores are irregularly alternating, and are situated near the anterior corners of the segments.

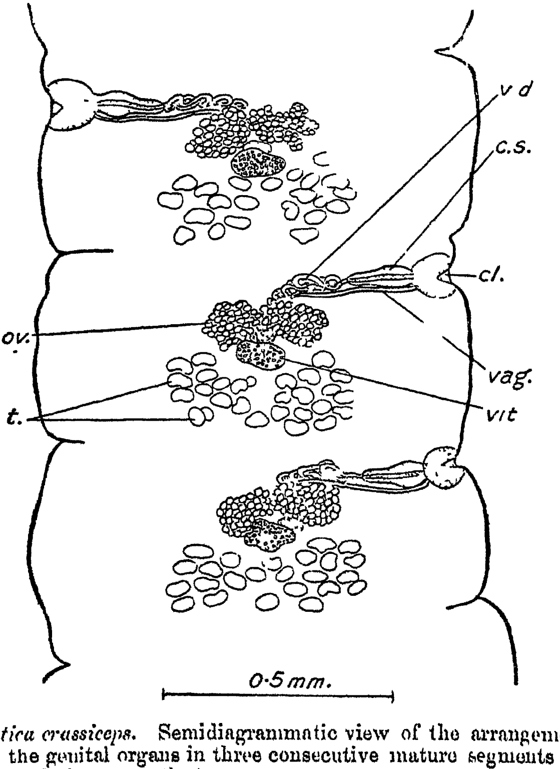
Internal Structure.

In a transverse section the medullary parenchyme occupies about one-third of the total dorso-ventral diameter. Of the longitudinal muscles, the inner layer, which separates the cortical from the medullary parenchyme, is the most highly developed, consisting of twenty to thirty bundles of fibres dorsally and a similar number ventrally. Externally to this, in the thickness of the cortical parenchyme, there is another layer, consisting chiefly of single fibres, vaguely subdivided into two concentric series.

The excretory system, as far as can be seen in the sections, consists of the usual two pairs of longitudinal vessels, which are situated at some distance from the lateral borders of the segments and nearer to the middle line than the longitudinal nerves. Both vessels on either side follow a very tortuous course. One of them is wider and thinner-walled than the other, but it is difficult to decide which is dorsal and which ventral. Transverse intersegmental vessels cannot be made out with any certainty, nor does there appear to be any network.

Genital Organs.—The genital pore leads into a cloaca (fig. 9, *cl.*) about 0·1 mm. long, with a narrow lumen distally, but expanding into a wider chamber proximally. The genital ducts pass between the two excretory vessels, and (assuming that the wider of these is, as usual, the ventral one) *ventrally* to the longitudinal nerve. (This is contrary to the arrangement found in other species of *Oochoristica* in which the point has been studied.) The cirrus-sac (fig. 9, *c.s.*) is of an elongate pear-shape, the widest part being nearest to the genital cloaca. It measures about 0·15 × 0·07 mm. The vagina (fig. 9, *vag.*) opens into the cloaca behind the cirrus-sac, in the same horizontal plane. It has a wide lumen for the greater part of its length, the distal portion probably serving as a receptaculum seminis. Just before reaching the female glands it suddenly becomes narrow. The vas deferens

Fig. 9.



Oochoristica crassiceps. Semidiagrammatic view of the arrangement of the genital organs in three consecutive mature segments (from a whole preparation).

cl., genital cloaca; *c.s.*, cirrus-sac: *ov.*, ovary; *t.*, testes; *vag.*, vagina; *v.d.*, vas deferens; *vit.*, yolk-gland.

(fig. 9, *v.d.*) is considerably coiled. There is no specialized seminal vesicle.

The general arrangement of the female organs is similar to that found in other species. The ovary (fig. 9, *ov.*) is the most anterior organ, and lies in the median field of the segment, very slightly towards the pore side. It attains a transverse diameter of nearly 0·4 mm., and is more or less distinctly divided into two lateral portions. The yolk-gland (fig. 9, *vit.*) lies behind it, and has a maximum diameter of about 0·1 mm. Between the ovary and yolk-gland is the shell-gland.

There are from twenty to thirty testes (fig. 9, *t.*), arranged in a single layer at the back of the segment, in the median field, and not extending forward at the sides further than the level of the yolk-gland. Their average longest diameter (transverse) is about 0·05 mm.

Mature segments begin to appear at about the fortieth from the posterior end. There are only about eight segments with fully developed organs before the appearance of extra-ovarian eggs. It is doubtful whether a uterus with a definite wall ever exists—if so, it only persists through one or two segments. The ova seem from the first to be scattered at random in the parenchyme without a definite enclosing membrane. The onchospheres measure about 30 μ in diameter.

This seems to be only the second species of *Oochoristica* recorded from a snake. The other is *O. rostellata*, Zschokke, 1905 *, from *Zamenis viridiflavus*. The present form appears to be more closely related to *O. rostellata* than to the various species from lizards, especially in the possession of a rudimentary rostellum, in the anterior position of the openings of the suckers, and in the excessively tortuous course of the lateral excretory vessels. It differs considerably from it, however, in dimensions and in the much smaller number of testes.

XXXV.—*Note on Young Specimens of* Anthenea *sp.*

By G. A. SMITH.

INCLUDED in a collection of echinoderms recently made by A. Loveridge, Esq., at Dar-es-Salaam, G.E.A., are two dry specimens which may be referred to the above genus.

Recent reports on collections from the above neighbourhood and from the Indian Ocean have contained descriptions of young specimens of *Pentaceros* and *Anthenea*, suggesting affinities with certain known species; but, on account of the lack of a large and varied series of specimens and the high degree of variation known to occur in these genera, authors have refrained from making specific determinations. This tendency of modern echinologists to resist the temptation of unduly creating new genera and species is of advantage to systematic workers. Attention will be drawn below to the tubercles on the marginal plates, and a suggestion is offered concerning certain spines on the actinal surface. In order that the life-history of these and allied forms may be determined, it is essential that the records of all young specimens should be collated, and that a collection be made of a series of specimens showing the developmental stages. This need is emphasized by the suggestion that some species possess spines only during certain growth-stages.

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* Zeitschr. f. wiss. Zool. lxxxiii. p. 53.

Anthenea sp.

Two immature examples from Dar-es-Salaam, G.E.A., 15/1/19; littoral zone. Coll. Loveridge. No. 14.

The colour of one specimen is pale yellow and of the other pink. They are approximately the same size, the main dimensions being as follows:—

$$R=23. \quad r=12. \quad R=1{\cdot}9r.$$

Body stellato-pentagonal. Disc 6 mm. thick, not elevated; arms 10 mm. broad at the base, tapering to 3 mm. at the distal end, round and slightly upturned. The lophial line is very distinct, and has fourteen rounded plates, the proximal five of which each have a blunt tubercle increasing in size towards the centre of the disc; the tubercles are roughened but not granulated. The interbrachial arc is subacute.

The dorso-lateral plates may be round or hexagonal, are large proximally, but diminish and become more regular in shape distally; they are covered with well-defined small round granulations. On each side and including the lophial line there are three parallel rows of round plates, extending from the centre to the distal end of the arm. The lophial series reaches the terminal plate, the other two rows stop short at the fourth supero-marginal plate (counting from the distal end). Small valvate pedicellariæ are irregularly disposed on these plates, excepting on the lophial line. One specimen appears to have been dead when collected, for the plates on the abactinal surface are much more definite, owing to the granulations having become worn by friction or by the action of the waves. This has made evident an arrangement similar to that in *Anthenea flavescens*, which in the second specimen is but barely suggested, viz., of a diagonal disposition of two rows of four lateral plates, leading from an interradial plate to an interbrachial arc. The plates are almost triangular, with the bases of opposed plates parallel. Proximally they are about 1 mm. in diameter, but the pair in contact with the supero-marginals is less; there is a faint fissure between the two rows. The pore-areas are round, slightly larger distally than proximally. All the plates of the apical system excepting the interradials bear tubercles, which here number from one to three and measure less than 1 mm. The central plate is composed of large granules which are heaped close together. There are about thirty-four and eighty-four tubercles on the abactinal plates of the respective specimens.

On the actinal surface the ventro-lateral plates are granulated, slightly convex, ovoid in shape, and decreasing in size as they approach the margin. There is a distinct row running on each side of the furrow and parallel to the ambulacral groove, extending to the third or fourth infero-marginal plate (counting from the distal end). The inter-oral plate is pear-shaped, and is the largest; several of the plates bear pedicellariæ. On the whole, the actinal face presents a closely tessellated surface. There is a well-defined furrow on each side of and parallel to the ambulacral groove; it is closely paved with very small round granules. Lying in the furrow are a number of small pedicellariæ with their long axes parallel to the groove. At the distal end of the arm, and on each side of the last two paired infero-marginal plates, are a series of six small blunt spines, which may be the result of the persistence of what was once a second row of adambulacral plates. The actinal distal end of the arm being slightly upturned, the spines would serve the purpose of very effective armature to an exposed part.

The adambulacral plates have three or four short, blunt, oval spines, not always equal; they are largest at the middle, but toward the oral region become short and thick; here, too, granules encroach upon their sides. There is one series only, and the plates in it are in contact with each other throughout.

There are fourteen supero-marginal and fourteen infero-marginal plates; both are granulated and take part in forming the sides of the arms; a well-defined line runs round the arms between the two sets of plates. The supero-marginals are convex and very prominent; at the interbrachial arc they rise 1 mm. above the disc, but distally they are almost level. The granulations resemble a mosaic of small plates, are distinct, of varying size, and generally round and slightly convex. Arranged transversely on these plates are one to six irregular dome-like tubercles, the majority of the plates having three; in some they have become fused together and elongated. The tubercles themselves are not granulated, but are developed from the granules, and on some of the plates the process may be seen in various stages of development. At the interbrachial arc the plates are wedge-shaped, 3 mm. broad and 4 mm. long, but distally they become broader and square. The terminal plate is small, being about the size of the last paired marginal. Further, it is granulated and may have tubercles.

The infero-marginal plates approximate to the supero-marginals, but continue on to the actinal surface also, and are well-defined; the change in shape distally is well illustrated in both specimens. The granulations are more regular than on the upper series. On the second plate, counting from the interbrachial arc, tubercles begin to develop and increase in size and number toward the distal end of the arm; but they are not nearly so prominent as those on the supero-marginal plates. There are no pedicellariæ on the marginal plates.

The madreporite, which occupies an interradial position, measures 2 mm.; it is lozenge-shaped and coarsely striated; the striæ radiate centrifugally, very little convolution being noticeable. It is surrounded by a ring of evenly placed granules.

The specimens are undoubtedly young examples, and correspond in some respects to the description of *Anthenea* sp. described by Simpson and Brown (1), and also have certain affinities with *Siraster tuberculatus* described by Clark (2). But the differences are so marked that it is not possible to accept Clark's very full generic and specific diagnosis as applicable to the present specimens. Kœhler (3) gives a very short account and a figure of *Anthenea* sp., juv.; but he does *not* refer to the ambulacral region, the description of which is essential to a correct identification of the specimens. The absence of tubercles from the centro-radial plates and from the supero-marginals are points wherein Kœhler's specimens differ from those above described.

LITERATURE.

(1) Simpson, J. J., and Brown, R. N. Rudmose. 1909. "Asteroidea of Portuguese East Africa." Proc. R. Phys. Soc. Edinburgh, xviii. (1910–1912) p. 50.

(2) Clark, H. L. 1915. "The Echinoderms of Ceylon, other than Holothurians." Spolia Zeylanica, x. pt. 37 (1915), p. 86.

(3) Kœhler, R. 1910. "An Account of the Shallow-water Asteroidea." Echinoderma of the Indian Ocean, pt. vi. p. 91, pl. xvi. fig. I.

XXXVI.—*A new Species of the Isopod Genus* Serolis.

By W. T. Calman, D.Sc.

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Among the numerous species of the genus *Serolis*, *S. latifrons*, Miers, stands apart on account of the structure of the uropods, which, as Beddard* pointed out, "recalls that characteristic of the Sphæromidæ." Beddard also stated that the species differed from all the other members of the genus in having minute "epimera" separated by suture from the first abdominal somite. It will be shown below, however, that these structures really belong to the last thoracic somite, of which no trace persists on the dorsal surface in any other species.

The Museum has recently received from the South Shetland Islands specimens of a new species agreeing in these and other characters with *S. latifrons*. The two species might very well be treated as forming a distinct genus, but it is not convenient to do so without undertaking the re-grouping of the remaining species of the genus *Serolis*. As a contribution towards this re-grouping, the following arrangement, based on some of the more obvious characters, is suggested:—

A. Uropods without endopod, exopod articulated to outer margin of the prolonged spiniform peduncle. Tergum of last thoracic somite interrupted in the middle, where the first abdominal comes in contact with the penultimate thoracic tergum; lateral portions persisting as a pair of minute sclerites each with a coxal plate separated by suture	Group of *S. latifrons*.
B. Uropods with endopod and exopod movably articulated with the peduncle. Tergum and coxal plates of last thoracic somite absent.	
a. Tergum of penultimate thoracic somite complete	Group of *S. paradoxa*.
b. Tergum of penultimate thoracic somite interrupted in the middle, so that the first abdominal comes in contact with the antepenultimate thoracic tergum ..	Group of *S. tuberculata*.

The first of these groups will contain, in addition to *S. latifrons*, only the new species described below. The group of *S. tuberculata* comprises the six Australian species named by Beddard (*l. c.* pp. 66 and 81) as forming "a well-marked subdivision of the genus," together with *S. bakeri*, recently described by Chilton *. The group of *S. paradoxa* includes all the remaining species of the genus, and will no doubt be found to deserve further subdivision.

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* Rep. Isopoda 'Challenger,' pt. 1, 1884, p. 46.

Studer †, who describes the uropods of *S. latifrons* in detail, regards the distal portion of the appendage as corresponding to the acute prolongation of the peduncle in *S. paradoxa* and other species, and states that one of the rami is suppressed while the other is reduced and spiniform. This interpretation (with the added assumption that the persisting ramus is the exopodite) is adopted here in preference to that of Beddard, who states that "the endopodite becomes fused with the protopodite and is extraordinarily elongated."

Beddard states that in *S. latifrons* "the first abdominal segment, which in no other species of *Serolis* known to me has any trace of epimera, has distinct though very minute epimera separated from the tergum by a suture which is continuous with that dividing the epimeron and tergum of the segment in front." The existence of distinct "epimera" (or coxal plates) on an abdominal somite would be without parallel not only in the genus *Serolis*, but among the Isopoda as a whole. As a matter of fact, the parts in question are quite similar in *S. latifrons* to those of the new species here described (text-fig. 2). A small sclerite (*b*), rounded or triangular in form, lies in contact with the external angle of the tergum of the first abdominal somite on each side. Separated from this sclerite by a groove or suture is a narrowly triangular or almost linear piece (*a*) wedged in between the terga of the first abdominal and the seventh (penultimate) thoracic somites. On disarticulating a specimen these two sclerites are easily separated from the first abdominal somite, and they are then seen to be continuous below with the sternal piece which carries the socket for the last pair of legs. There can be no doubt that the outer of the two sclerites (*b*) is the coxal plate of the last thoracic somite, and that the narrow piece (*a*) with which it is connected on the inner side is a vestige of the tergum of the same somite. This persistence of the lateral portions of the tergum is an interesting parallel to what happens in the case of the seventh (penultimate) thoracic tergum in the species of the *tuberculata* group, although in that case the lateral portions and their associated coxal plates remain of large size.

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* Trans. Roy. Soc. S. Australia, xli. 1917, p. 398.

† Arch. Naturg. xlv. (1) 1879, p. 31.

Descriptions of species of *Serolis*, even those of some recent authors, tend to be obscure or even misleading as regards the general segmentation of the body. Grube[*], describing in certain species a dark transverse line (really a ridge) on the lateral expansions of the segment following the head, regarded it as indicating that this segment was composed of two somites, those of the maxillipeds and first legs (or gnathopods) respectively. On this view the groove or suture-line which marks off the head runs between the maxillary somite and that of the maxillipeds. This interpretation was accepted and clearly enunciated by Beddard (*l. c.* p. 8), and is more obscurely implied by many subsequent writers. Gerstaecker[†] confused matters still further by assigning the maxillipeds to the head while stating that the *two following* somites were fused together—an opinion that had the advantage of accounting for the full number of thoracic terga, but could hardly have survived the examination of a single specimen. As a matter of fact, in *Serolis*, as in all other Malacostraca with the exception of *Bathynella*[‡], the first thoracic somite (that of the maxillipeds) is completely incorporated in the head. The articulation between the head and the second thoracic somite, which in most Isopods is more or less movable, is represented in *Serolis* by a suture-line which corresponds, at the sides of the head, to a deep fold of the exoskeleton, but in the occipital region becomes reduced to a shallow groove. Grube's "dunkle Querlinie," whatever its significance, cannot possibly indicate the limit between two somites.

The chief differences between the two species composing the *latifrons* group may be briefly set forth as follows:—

Dorsal surface of head and body-somites nearly smooth. Telsonic segment smooth except for a median and a pair of curved submarginal ridges	*S. latifrons*, Miers.
Dorsal surface of head and body-somites strongly sculptured. Telsonic segment studded with tubercles between the median and submarginal ridges and with a pair of short submedian ridges	*S. beddardi*, sp. n.

Serolis beddardi, sp. n. (Text-figs. 1–3.)

Locality.—"From stomachs of fish (*Trematomus* or *Notothenia*). Deception Island, Bransfield Straits, 5–7 fath. 22. 1. 18," 1 ♀ (holotype), 1 ♂.

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[*] Arch. Naturg. xli. (1) 1875, p. 211.

[†] Bronn's 'Thierreich,' Crustacea, p. 19 (1880).

[‡] Calman, Quart. Journ. Micr. Sci. lxii. 1917, p. 502.

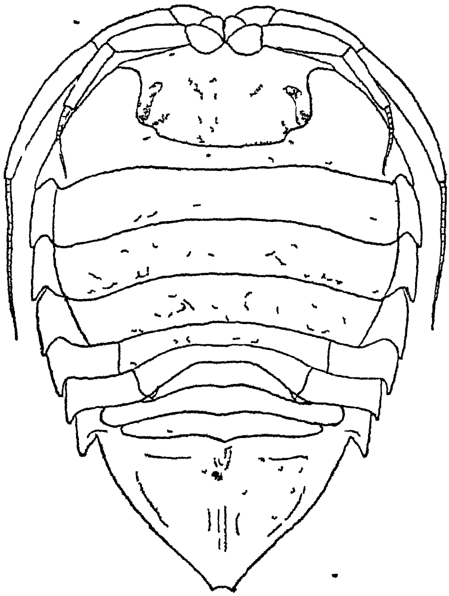
"From stomachs of fish. South Shetlands. 5. 1. 14." Many specimens (dried).

"From stomachs of Rock Cod. Outside Deception Island, Bransfield Straits. 18. 12. 13." Many specimens.

Collected by Mr. A. G. Bennett. In each case the specimens were accompanied by numbers of *S. polita*, Pfeffer.

Description.—Closely resembling *S. latifrons*, Miers, but with the dorsal surface strongly sculptured. The body is less convex and, as a rule, somewhat narrower. Dorsal surface of head, terga of thoracic and abdominal somites, and, to a less extent, the coxal plates rugose or vermiculate with a more or less symmetrical pattern. The coxal plates, especially those of the last three complete thoracic somites, much less produced backwards and less acute than in *S. latifrons*, although with some variation in both species. The pit on the under surface of each side-plate of the second thoracic somite (Grube's "sense-organ") is deep and sharply

Fig. 1.

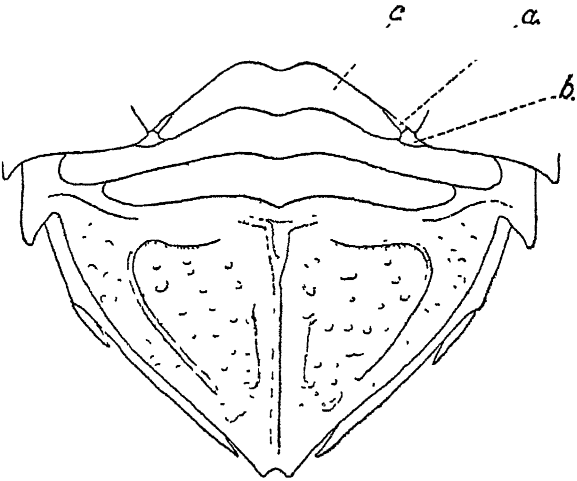


Serolis beddardi, sp. n., female × 3

defined; the arched outer margin of this side-plate is minutely serrated, and, like the margins of the succeeding coxal plates, is fringed with long setæ.

The telsonic segment (text-fig. 2) is rather broader and its lateral margins more sinuous than in *S. latifrons*. The median keel, with a marked pit near its anterior end where it unites with a short curved transverse ridge, is similar in the two species. The submarginal ridge on each side also runs a similar course in both, parallel to the front margin anteriorly, then curving round to run parallel to the lateral margin, but it is more sharply defined in the new species, and, in the anterior part of its course, it is undercut posteriorly. On either side of the median keel, behind the middle of the segment, is a pair of short, somewhat irregular, submedian ridges, converging posteriorly. Between the ridges the surface is studded with prominent widely-spaced tubercles or granules.

Fig. 2.



Serolis beddardi, sp. n., female. Posterior part of body, further enlarged. *a*, vestige of tergum of eighth thoracic somite; *b*, coxal plate of same somite; *c*, tergum of first abdominal somite.

The appendages differ very little from those of *S. latifrons*. The distal segments of the walking-legs are rather less slender.

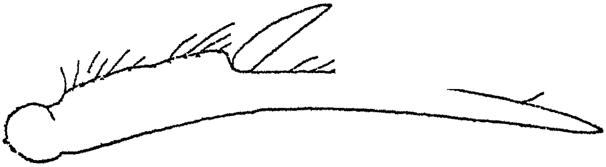
Although there is some variation in the relative length of the exopod of the uropods, it is usually about one-fifth of the total length of the appendage. Studer figures it in *S. latifrons*[*] as about one-third of the total length, but in the specimens which I have examined it does not differ conspicuously from that of *S. beddardi*.

Measurements in mm.—Holotype (female with empty marsupium): length 23·76, breadth (across third thoracic somite) 16·5, depth of body about 6·25; telsonic segment, length 7·5, breadth 12·5.

Male: length 22·0, breadth 16·75, depth about 5·25.

The largest specimen (a female) measures 25 mm., the smallest 6·5 mm. in length. In very small specimens the sculpturing of the dorsal surface and the tubercles of the telsonic segment are much less marked, but the submedian ridges of the latter are well developed.

Fig. 3.



Serolis beddardi. Right uropod, from above.

Remarks.—If *Serolis latifrons* is confined, as seems possible, to the Kerguelen area[†], the habitat of *S. beddardi* is separated by no less than 130 degrees of longitude from that of its most closely related congener. Mr. C. Tate Regan has called my attention to a similar parallelism among the fishes of the genus *Notothenia* in the two regions of Kerguelen on the one hand and South Georgia and Graham Land on the other[‡].

It seems only fitting that one of the species of *Serolis* should bear the name of the author to whom we owe the 'Challenger' monograph of the genus.

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[*] Arch. Naturg. xlv. (1) 1879, pl. iii. fig. 20.

[†] The type-specimen named by White and described by Miers is stated to have come from the Auckland Islands (Rendezvous Cove), but the species has not since been recorded from that locality. As the specimen reached the Museum in a collection comprising others from Kerguelen (*e. g.*, the types of *S. quadricarinata*), there may possibly have been some confusion of localities.

[‡] Regan, Fishes Brit. Antarct. ('Terra Nova') Exp. 1914, p. 36.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 34. OCTOBER 1920.

XXXVII.—*Notes on various African and Asiatic Species of* Hapalochrus, *Er., with an Account of their accessory ♂-characters* [*Coleoptera*]. By G. C. Champion, F.Z.S.

[Concluded from p. 266.]

[Plate VIII.]

46. *Hapalochrus filicornis*, sp. n.

♂. Very like *H. foveiger* (No. 44), and differing as follows: antennæ slender, filiform; elytral puncturing a little denser and finer; anterior tibiæ more slender, simply excavate in about their outer third within; intermediate femora not foveate at the base inferiorly; intermediate tibiæ narrower and much less thickened (only a little stouter than in ♀), foveate at the middle beneath, and also shallowly excavate at the apex inferiorly, without definite lobe at the inner apical angle.

♀. Antennæ as in ♂.

Length 5–5½, breadth 2–2¼ mm. (♂ ♀.)

Hab. E. Africa, Kashitu and Mwengwa, N. Rhodesia (*H. C. Dollman*: i., ii., xi. 1914 and i. 1915).

Described from two precisely similar males and three females. Very like *H. foveiger* from the same region, with the ♂-characters less developed than in most of the allied species. The anterior tarsi have the second joint narrowly extended over the third, as in the ♂ of that insect. Smaller and less robust than *H. janthinus*, Fairm. (*goossensi*, Pic), the elytral puncturing much finer, the intermediate tibiæ of ♂ narrow.

47. *Hapalochrus angulatus*, sp. n.

♂. Elongate, somewhat convex, shining, the head subopaque; thickly clothed with rather long, semi-erect hairs; cyaneous, bluish-green, or green, the antennal joints 1–3 in part, and the intermediate femora at the base, testaceous, the rest of the legs and antennæ black or metallic. Head densely punctulate; antennæ not very stout, subfiliform. Prothorax transverse, obliquely narrowed behind, closely punctulate laterally, almost smooth on the disc. Elytra long, widened to near the apex; broadly rounded at the tip; densely, not very coarsely punctate. Anterior tibiæ compressed and slightly sinuate; anterior tarsal joints 1 and 2 slightly thickened, subequal in length, 2 with a claw-like extension over 3; intermediate tibiæ (Pl. VIII. fig. 28) moderately thickened, angularly dilated at the middle externally, and deeply, sinuously excavate from about the basal third to near the apex, and also excavate at the tip, beneath.

♀. Legs wholly black or metallic.

Length 4–4$\frac{1}{10}$, breadth 2 mm. (♂ ♀.)

Hab. E. Africa, E. foot and slopes of Aberdare Mts., alt. 7000–8500 ft. (*S. A. Neave*: 24–27. ii. 1911: ♂, type).

Described from two males with precisely similar ♂-characters, the angular lateral median dilatation of the intermediate tibiæ being an unusual development in the genus. *H. rollei* and *H. sinuatipes*, Pic (1911), from "E. Africa," are perhaps allied forms.

48. *Hapalochrus cyanocephalus*, sp. n.

♂. Elongate, rather narrow, shining, the head opaque; finely pubescent, and also clothed with long, semi-erect, fuscous hairs; head and prothorax cyaneous, the elytra green, the antennal joints 1–4 in part, the bases of the intermediate femora beneath and the ventral segments (some black markings excepted) testaceous, the rest of the legs, antennæ, and under surface black. Head rugulosely punctulate; antennæ long, rather stout, subfiliform. Prothorax broader than long, very sparsely punctulate, smooth on the disc. Elytra long, gradually widening to near the apex, the latter rounded; densely, rugulosely punctured.

Anterior tibiæ sinuate, compressed before the tip; anterior tarsal joints 1 and 2 slightly thickened, 2 extending over 3; intermediate tibiæ moderately thickened, sinuate externally, without lobe at the inner apical angle, excavate at the middle and apex beneath.

Length $3\frac{1}{2}$, breadth $1\frac{2}{3}$ mm.

Hab. W. CENTRAL AFRICA, Nyangwe, Belgian Congo (*R. Mayné*: iii.–iv. 1918).

One male. This species agrees with *H. testaceicornis*, *dilaticornis*, &c., in having a finely rugulose, opaque, blue head; but it differs from them in the basally unarmed anterior femora, the simply sinuate, feebly incrassate, non-appendiculate intermediate tibiæ, and the undilated antennæ (which are formed as in the ♀ of the insects mentioned), of the ♂. *H. inchoatus*, found at the same date at Nyangwe, has a shining, more distinctly punctured head. *H. angulatus*, from the Aberdare Mts., is perhaps the nearest allied form to *H. cyanocephalus*, the latter having the elytra less dilated posteriorly and more densely and not so coarsely punctate, and the intermediate tibiæ of ♂ less angulate externally.

49. *Hapalochrus rhodesianus*, sp. n.

♂. Moderately elongate, shining, sparsely clothed with fine pubescence intermixed numerous long, erect, fuscous hairs; blue or bluish-green, the head and prothorax sometimes brassy-cupreous, the antennæ, palpi, and legs black or metallic. Head short, slightly depressed in front, sparsely punctate; antennæ rather short, broad, serrate, joints 5–9 strongly transverse. Prothorax much broader than long, a little wider than the head, very sparsely punctate, smooth and feebly canaliculate on the middle of the disc. Elytra widened posteriorly, depressed on the disc below the base, coarsely, closely punctate, the puncturing becoming a little sparser anteriorly. Anterior trochanters with a curved, hook-like tooth; anterior femora with two or three setæ at the base; anterior tibiæ sinuate, compressed towards the apex; anterior tarsal joints 1 and 2 slightly thickened, 2 extending over 3; intermediate tibiæ moderately and abruptly widened from a little below the base to near the tip, excavate at the apex beneath.

♀. Antennæ much more slender, feebly serrate.

Length $3\frac{3}{4}$–5, breadth $1\frac{3}{4}$–2 mm. (♂ ♀.)

Hab. E. AFRICA, Mwengwa in N.W. Rhodesia (*H. C. Dollman*: xii. 1913 and i. 1914).

Eleven examples, including four males. Smaller, less elongate, and more shining than *H. platycerus* (No. 35), the antennæ less dilated, the head and prothorax shorter and much smoother, the elytra coarsely, less densely punctate, the intermediate tibiæ of the male comparatively slender, and abruptly, equally thickened from near the base, the anterior trochanters toothed in the same sex. The more closely punctured elytra, and the broader antennæ and angulate intermediate femora in ♂, separate the present species from *H. hamatus*.

50. *Hapalochrus furcatus*, sp. n.

♂. Moderately elongate, shining, sparsely clothed with fine pubescence intermixed with numerous long, erect, blackish hairs; cyaneous, the head and prothorax sometimes brassy or green, the legs, palpi, and antennæ black or metallic. Head short, sparsely punctulate; antennæ moderately long, rather stout, feebly serrate, joints 3–9 longer than broad. Prothorax much broader than long, sparsely punctulate, smooth across the middle of the disc. Elytra gradually widened posteriorly, depressed on the disc below the base, rather coarsely and not very closely punctate, the puncturing becoming more diffuse anteriorly, the interspaces here and there obliquely raised or plicate. Anterior trochanters unarmed; anterior tibiæ with a rather stout obliquely raised lobe at the middle above and compressed thence to the apex; anterior tarsal joints 1 and 2 slightly thickened, 2 extending over 3; intermediate tibiæ moderately thickened, sinuate, excavate at the middle and tip beneath.

♀. Antennæ more slender and much shorter.

Length 4–4½, breadth 1¾–2 mm. (♂ ♀.)

Hab. E. Africa, Kashitu in N.W. Rhodesia (*H. C. Dollman*: i. 1915).

Three males and four females. Recognizable by the obliquely lobed anterior tibiæ and the simply sinuate, moderately thickened intermediate tibiæ of the male, the elytra rather sparsely punctate and with somewhat plicate interspaces, the upper surface very shining, wholly or in great part cyaneous, the legs and antennæ black or metallic. The puncturing of the elytra is sparser and a little finer than in *H. rhodesianus*, a character by which their respective females may be separated.

51. *Hapalochrus irregularis*, sp. n.

♂. Moderately elongate, rather narrow, very shining, sparsely pubescent, and also somewhat thickly set (the legs included) with long, dark, suberect, bristly hairs; cyaneous or bluish-green, the elytra sometimes brassy, the legs, antennæ, and palpi black or metallic, the abdomen in part testaceous. Head and prothorax sparsely punctulate, the latter transverse and smooth on the disc: antennæ serrate, rather stout, long, about reaching the middle of the elytra. Elytra widened posteriorly, sharply margined, depressed on the disc anteriorly, bluntly rounded at the tip; rather sparsely, irregularly, moderately coarsely punctate, the interspaces uneven, here and there transversely or obliquely plicate. Anterior tibiæ with a broad rounded lobe at the middle, and excavate and compressed beyond this; anterior tarsal joints 1 and 2 thickened, 2 projecting over 3; intermediate tibiæ moderately incrassate, sinuate, subangulate externally, and deeply excavate at the middle and apex beneath, without lobes at the tip.

Length 4–4½, breadth 1⅘–2 mm.

Hab. W. Central Africa, Congo da Lemba (*R. Mayné*: i., ii., iv. 1913), Léopoldville (*Dr. A. Dubois*: v.–vi. 1911).

Described from twelve males belonging to the Congo Museum, all but one from Congo da Lemba. Near the Rhodesian *H. furcatus*, the antennæ much longer, the intermediate tibiæ stouter (formed much as in *H. angulatus*), the median lobe of the anterior pair larger. The elytra have an immature appearance as in *H. mollis* (No. 53), the puncturing being much coarser than in that species. The ♀ is apparently unrepresented in the abundant Congo material before me.

52. *Hapalochrus amadiensis*, sp. n.

♂. Elongate, narrow, very shining, sparsely pubescent and also somewhat thickly set with long, semi-erect, blackish, bristly hairs; cyaneous, the basal joint of the antennæ beneath and the ventral sutures testaceous, the rest of the antennæ, the palpi, and legs black or metallic. Head and prothorax very sparsely punctulate, the latter smooth on the disc and nearly as long as broad; antennæ moderately long, rather stout, subserrate. Elytra long, widened posteriorly, sharply margined, rounded at the tip, depressed on the disc anteriorly; coarsely, closely punctate, the interspaces here and there transversely or obliquely plicate. Anterior trochanters with a short blunt tooth; anterior tibiæ simply sinuate, without median dilatation; anterior tarsal joints 1 and 2 thickened, 2 projecting over 3; intermediate femora hollowed before the apex beneath, appearing subangulate at the middle; intermediate tibiæ slightly sinuate and feebly, abruptly incrassate from near the base to the tip, the lower surface foveate at the middle and hollowed at the apex.

Length 5, breadth $2\frac{1}{5}$ mm.

Hab. W. Central Africa, Amadi, Belgian Congo (*P. van den Plas*: iv. 1913).

One male, in the Congo Museum. More elongate than *H. irregularis* (♂), the antennæ much shorter, the prothorax less transverse, the elytra more coarsely punctured, the anterior tibiæ simply sinuate, the intermediate tibiæ feebly, abruptly widened from near the base, as in the same sex of the Rhodesian *H. hamatus*. Compared with the last-named insect, the ♂ of the present species may be distinguished by the stouter anterior tibiæ, the subserrate antennæ, and the closely, coarsely punctate elytra. The simply sinuate anterior tibiæ, the subangulate intermediate femora, and the more coarsely punctured elytra separate *H. amadiensis* from *H. confusus*, ♂, an insect with similar intermediate tibiæ.

53. *Hapalochrus mollis*, sp. n.

♂. Elongate, shining, thickly clothed with long, fine, erect hairs; bluish-green or green, the head and prothorax sometimes brassy or the elytra cyaneous, the antennæ, palpi, and legs wholly black or metallic; head and prothorax sparsely punctulate, the latter smooth on the disc. Antennæ stout, serrate, tapering towards the tip, joints 6–9 strongly transverse. Prothorax transverse, small, obliquely narrowed behind. Elytra long, widened posteriorly, uneven, depressed on the disc below the base; closely, finely punctate, the interspaces here and there obliquely plicate. Anterior tibiæ thickened at a little beyond the middle and hollowed thence to the apex; anterior tarsal joints 1 and 2 slightly thickened, subequal in length, 2 extending over 3; intermediate tibiæ rather broadly, abruptly, and equally widened from near the base to the apex, distinctly sinuate externally, truncate at the tip.

♀. Antennæ shorter and not so stout, feebly serrate.

Length $3\frac{1}{2}$–4, breadth $1\frac{1}{2}$–2 mm. (♂ ♀.)

Hab. E. and W. Central Africa, S. of Lake George [type] and Plains N.E. of Lake Edward in Uganda, Valley of Upper Nzoia River, N. Kavirondo, S. foot and slopes of

Mt. Elgon, alt. 3200–5800 ft. (*S. A. Neave*: vii., x. 1911: ♂ ♀); Belgian Congo, Kasindi (*Dr. Bayer, in Mus. Congo Belge*: 13. iv. 1912: ♀).

Three males and three females captured by Dr. Neave and a female by Dr. Bayer. A small, bluish-green, hairy insect, with uneven, finely punctured elytra, and black legs and antennæ, the ♂ with stout, serrate, tapering antennæ, and abruptly widened, sinuate intermediate tibiæ. The finely punctured elytra separate *H. mollis* from *H. rhodesianus* and *H. hamatus*, both of which have different ♂-characters.

54. *Hapalochrus armatus*, sp. n.

♂. Elongate, shining, clothed with long, blackish, semi-erect hairs; green, bluish-green, or violaceous, the antennæ almost wholly, and the legs entirely, black or metallic; head and prothorax very sparsely punctate, the latter smooth on the disc. Antennæ stout, serrate, moderately long. Prothorax transverse, convex, obliquely narrowed behind. Elytra long, widening to near the apex, somewhat flattened on the disc, more or less depressed or hollowed below the base, rounded at apex; closely, confusedly, rather coarsely punctate, smoother and diffusedly punctured at the base. Anterior trochanters produced into a short blunt tooth; anterior tibiæ rather stout, rapidly widened to about the middle, and obliquely compressed beyond this; anterior tarsal joints 1 and 2 subequal in length, slightly thickened, 2 extending over 3; intermediate femora almost straight; intermediate tibiæ moderately incrassate, slightly sinuate, excavate at the middle and apex beneath.

♀. Antennæ a little shorter and more slender.

Length 5, breadth 2½ mm. (♂ ♀.)

Hab. E. Africa, Mlanje in Nyasaland (*S. A. Neave*: 17. iii. 1913).

One pair. Larger and more robust than *H. hamatus* and *H. rhodesianus*, the elytra more closely punctured, the anterior tibiæ strongly dilated. The following species, *H. confusus*, seems to be its nearest ally.

55. *Hapalochrus confusus*, sp. n.

♂. Extremely like *H. armatus* and differing as follows: the elytra a little more finely punctured, the interspaces more uneven, here and there obliquely raised; anterior trochanters unarmed; anterior tibiæ feebly, subangularly dilated; intermediate femora hollowed before the apex (appearing subangular at about the middle); intermediate tibiæ slightly narrower, feebly sinuate.

♀. Elytra rounded or subacuminate at apex.

Length 4–5½, breadth 2–2⅔ mm. (♂ ♀.)

Hab. E. AFRICA, Nandi Escarpment [type] and S. foot and slopes of Mt. Elgon [♂ ♀], Mpanga Forest, Toro, Top of Escarpment N. of Fort Portal, Jinja–Busia, and Yala River, S. edge of Kakumba Forest, alt. 3800–5800 ft. (*S. A. Neave*: ♂ ♀), Ngare Narok, Masai Reserve (*Capt. A. O. Luckman*: ♀).

Six males and numerous females, the latter possibly not all belonging here. *H. confusus* forms a sort of connecting-link between *H. armatus* and *H. amadiensis*, these two insects having toothed anterior trochanters in ♂, and the latter wanting the angular dilatation of the anterior tibiæ in the same sex. Some of the females slightly approach *H. caudatus*, type ♀, in the shape of the elytra, and females of both of them were taken near Jinja.

56. *Hapalochrus caudatus*, sp. n.

♀. Elongate, somewhat depressed, shining, sparsely pubescent and also clothed with long, erect, fuscous hairs; brassy or bluish-green, the elytra in great part or wholly cyaneous, the antennæ (the testaceous lower surface of joint 1 excepted) and legs black or metallic. Head and prothorax almost smooth, the latter broader than long and obliquely narrowed behind; antennæ rather short, subserrate. Elytra long, widening to near the apex and then rapidly narrowed and produced at the tip, sharply margined laterally, flattened or depressed on the disc anteriorly; closely, somewhat coarsely punctate, the interspaces here and there obliquely plicate.

Length 5¼–6½, breadth 2½ mm.

Hab. E. AND W. CENTRAL AFRICA, Mbale–Kumi Road, south of Lake Salisbury, between Jinja and Busia, Siroko R., near west foot of Mt. Elgon, and Banks of Nile near Kakindu, alt. 3400–4000 ft. (*S. A. Neave*: viii. 1911), Kambove, Katanga, alt. 4000–5000 ft. (*S. A. Neave*: iii. 1907: type); Belgian Congo, Kilom. 245 de Kindu (*L. Burgeon, in Mus. Congo Belge*: 25. ii. 1912).

Seven females, varying in the length of the caudiform apices of the elytra. No male has been detected in the collections before me that seems likely to belong to this species, the first to be described with the elytra thus shaped. *H. confusus* is perhaps the nearest ally; but the ♀ of that insect has the elytra rounded or very slightly produced at the apex, and the confused puncturing closer and finer.

57. *Hapalochrus maynei.*

♂. *Hapalochrus maynei*, Pic, Rev. Zool. Africa, iii. p. 381 (1914).

♂. Antennæ comparatively short and slender, subfiliform, joints 3–5 not longer than broad; anterior trochanters unarmed; anterior tibiæ slender, slightly compressed beyond the middle; anterior tarsal joints 1 and 2 a little thickened, 2 extending over the base of 3; intermediate femora slender; intermediate tibiæ feebly incrassate, distinctly sinuate externally, foveate at about the middle beneath.

Hab. W. CENTRAL AFRICA, Congo da Lemba [type] (*R. Mayné*: v. 1912, i.–iv. 1913: ♂ ♀), Nyangwe (*R. Mayné*: iii.–iv. 1918: ♀), Amadi (*P. van den Plas*: iii.–iv. 1913: ♀).

The ♂-characters given above are taken from a long series from Congo da Lemba, including the type and numerous other specimens of the same sex. Amongst the various very similar insects from the same region, *H. densatus*, *longicornis*, *patruelis*, &c., all of which have the sides of the prothorax rugulose, *H. maynei* may be distinguished by its small size (length $2\frac{1}{3}$–$2\frac{2}{3}$ mm.), the short, slender antennæ in both sexes, the feebly thickened intermediate tibiæ in ♂, and the finely punctured elytra.

58. *Hapalochrus dollmani*, sp. n.

♀. Elongate, narrow, almost parallel-sided, shining, clothed with fine whitish pubescence intermixed with very long, erect, fuscous hairs; bluish-green, the head and prothorax with a faint brassy tinge, the mouth-parts, basal joints of antennæ, and the tibiæ, tarsi (except at their tips), and ventral sutures, testaceous, the rest of the antennæ black. Head sparsely punctulate, tumid in the middle in front; antennæ slender, serrate, rather elongate. Prothorax broader than long, nearly as wide as the anterior portion of the elytra, narrowed behind, convex, deeply foveate in the middle and excavate laterally at the base, sparsely punctate along the margins. Elytra long, slightly widened posteriorly, depressed on the disc below the base, densely, very finely, rugulosely punctate.

Length $4\frac{1}{2}$, breadth $1\frac{3}{5}$ mm.

Hab. E. AFRICA, Mwengwa, N.W. Rhodesia (*H. C. Dollman*: 13. iv. 1904).

One female. Near the Palæarctic *H. femoralis*, Er., and similarly coloured; the antennæ longer, serrate; the head much smoother; the elytra more densely punctate; the erect, dark, bristly hairs on the upper surface longer. The ♂ probably has slender intermediate tibiæ, as in the less elongate S. African *H. dasytiformis* (No. 10), and in the northern *H. femoralis* and its allies. In the absence of this sex, *H. dollmani* cannot be included in the Key given on pp. 179–180.

59. *Hapalochrus semilævis*, sp. n.

♂. Rather short, pilose, very shining; bluish-green, the elytra cyaneous, the antennæ (the testaceous lower surface of the basal joints excepted) black or metallic. Head and prothorax almost smooth, the head short, broad, the prothorax transverse, obliquely narrowed behind; antennæ rather slender, the joints from 3 onwards much longer than broad, 2 longer than 3. Elytra rather short, rapidly widened from the base, blunt at the tip, transversely depressed on the disc below the base and along the suture anteriorly; coarsely, closely punctate, almost smooth at the base and apex. Anterior trochanters sharply toothed; anterior tibiæ rather stout, strongly sinuate, compressed and excavate towards the apex within, and abruptly emarginate and diaphanous on its inner edge before the tip; anterior tarsal joint 2 short, simple; intermediate tibiæ rapidly thickened from the base, becoming very stout towards the apex, rounded and convex externally, hollowed before the tip within, and with a short, compressed lobe at the inner apical angle.

Length 4½, breadth 2 mm.

Hab. E. Africa, Dedza District, Central Angoniland, alt. 4000–5000 ft. (*S. A. Neave*: 21–27. v. 1910).

One male. In this insect the elytra are rather short and subtriangular, coarsely, closely punctured at the sides and across the middle, and almost impunctate at the base and apex, a form of sculpture unusual in the present genus; and the anterior trochanters are sharply toothed, the anterior tibiæ strongly sinuate, and the intermediate tibiæ very stout. The nearest allied form in the collections before me, *H. inæqualis* from Nyasaland &c., also has simple anterior tarsi in ♂.

60. *Hapalochrus inæqualis*, sp. n.

♂. Moderately elongate, clothed with erect, blackish, bristly hairs; brilliant bluish-green, the elytra cyaneous in one specimen, the antennæ (the testaceous lower surface of the basal joints excepted) and legs black or metallic. Head and prothorax almost smooth, the head short, broad, the prothorax transverse, obliquely narrowed behind; antennæ rather stout, the joints longer than broad. Elytra widening posteriorly, rounded at the apex, transversely excavate on the disc anteriorly and depressed along the suture at the base; unequally punctate, the punctures coarse and crowded at the sides and more scattered on the disc, becoming very fine or obsolete at the base and apex. Anterior trochanters produced into a very short tooth; anterior tibiæ rather slender, obliquely excavate, and with the inner margin diaphanous towards the apex; anterior tarsal joint 2 shorter than 1, simple; intermediate tibiæ almost straight, becoming gradually stouter towards the apex, and furnished with a rather long narrow lobe at the inner apical angle and a curved pencil of hairs beneath the outer angle.

♀. Antennæ not quite so stout; body fully winged.

Length 4½–5, breadth $2\frac{1}{10}$–2½ mm. (♂ ♀.)

Hab. E. Africa, Mlanje in Nyasaland (*S. A. Neave*: 8. i. 1913: ♂ ♀), Lusinga Isl., E. Victoria Nyanza (*S. A. Neave*: iv. 1911: ♀).

A pair from Mlanje and a ♀ from Lusinga. More elongate than *H. semilævis*, the puncturing of the disc of the elytra more diffuse; the ♂ with a shorter spur to the anterior trochanters, the anterior tibiæ less sinuate, and the intermediate pair straighter, less swollen, and bearing a longer appendage at the inner apical angle. The anterior tarsi of ♂ are simple as in *H. amplipennis* and *H. modestus*.

61. *Hapalochrus triangularis*, sp. n.

♂. Of the general facies of *H. modestus*, Bourg.; brassy green above; antennæ rather slender; prothorax obliquely narrowed and very feebly sinuate at the sides before the base; elytra comparatively short, much widened posteriorly, bluntly rounded and somewhat convex at the apex, the puncturing not quite so coarse; anterior trochanters toothed; anterior tibiæ feebly dilated at the middle (as in *H. modestus*); anterior tarsi simple; intermediate tibiæ (Pl. VIII. fig. 29) strongly incrassate, convex and rounded externally, excavate and with a short compressed lobe near the inner apical angle.

Length 3½, breadth $1\frac{9}{10}$ mm.

Hab. E. Africa, Kikuyu Escarpment, Kijabe–Limuru, Uganda Railway, alt. 7000 ft. (*S. A. Neave*: iii. 1911).

One male. A larger, more robust ♀ (length 5 mm.), found at a lower elevation S. of Lake George, with stouter antennæ and relatively longer elytra, and another from E. Busoga, cyaneous in colour, both taken by Dr. Neave, may belong to the same species. *H. viridimetallicus*, *jeanneli*, and *lusanganus* var. *dentaticoxis*, Pic (1919), are doubtless allied forms, but the incomplete diagnoses are useless for the purposes of identification; the sex of the first two of them is not stated, and the third should have a tooth on the anterior trochanters, not on the coxæ.

62. *Hapalochrus constricticollis*, sp. n.

♂. Elongate, shining, clothed with long, semi-erect blackish hairs; head bluish-green, prothorax brassy-black, elytra cyaneous, the antennæ, palpi, legs, and under surface greenish or black, the antennal joints 1–3 testaceous beneath. Head and prothorax very sparsely punctulate, the prothorax almost smooth on the disc, nearly as long as broad, and strongly constricted posteriorly, the basal portion narrow; antennæ long, subfiliform, rather stout. Elytra long, flattened on the disc, widening to near the apex, the latter rounded; very coarsely, closely, uniformly punctate. Anterior trochanters dentate; anterior tibiæ gradually widened to about the middle and then obliquely sulcate and compressed; anterior tarsi simple, joint 2 shorter than 1; intermediate tibiæ (Pl. VIII. fig. 30) strongly incrassate, rapidly widening from the base, sinuate externally, and furnished with a rather broad, compressed, outwardly curved, appendage at the inner apical angle, the outer apical angle toothed beneath, the lower surface deeply, obliquely excavate beyond the middle and also excavate at the apex, the apical excavation fringed with long fulvous hairs in front.

Length $4\frac{1}{10}$, breadth $2\frac{1}{10}$ mm.

Hab. W. Central Africa, Beni–Lesse, Belgian Congo (*Dr. Murtula*: vii. 1911).

One male. More elongate than *H. modestus*, Bourg., the type of which is before me, the prothorax more strongly constricted before the base, the dilated median portion of the anterior tibiæ not produced into a tooth (as in *H. modestus*, the ♂ thus differing from that of *H. amplipennis*), the intermediate tibiæ with a longer, compressed, curved appendage at the inner apical angle.

63. *Hapalochrus cyaneonitens*, sp. n.

♂. Elongate, rather convex, very shining, thickly clothed the legs, palpi, and antennæ black or metallic, the intermediate trochanters in one specimen, and the ventral sutures, reddish. Head sparsely punctate; antennæ rather stout, long. Prothorax transverse, wider than the head, smooth on the disc, sparsely punctured at the sides. Elytra long, widened posteriorly, very coarsely, somewhat diffusely punctate, the puncturing becoming more crowded at the sides and finer at the base. Anterior tibiæ rather stout, thickened at the middle, and then strongly, obliquely compressed; anterior tarsal joints 1 and 2 subequal in length, slightly thickened, 2 simple; intermediate tibiæ greatly thickened, convex externally, excavate at the middle and apex beneath, and with a short compressed lobe at the inner apical angle.

Var. *kamerunus*, n. The elytra much more closely and finely punctured, the vestiture longer and more abundant. [♂ ♀.]

Length 5–6, breadth $2\frac{1}{2}$–$2\frac{4}{5}$ mm. (♂ ♀.)

Hab. E. AND E. CENTRAL AFRICA, Road to Kilossa, Usagara District, alt. 1500–2500 ft. [type] (*S. A. Neave*: 22–26. xii. 1910: ♂ ♀), Serenje District in N.E. Rhodesia, alt. 4500 ft. (*S. A. Neave*: 16. xii. 1907: ♂); W. CENTRAL AFRICA, Babua Bondaye, Kamerun (6. v. 1914: *Mus. Brit.*: ♂ ♀, var.).

Extremely like the variable and abundant *H. janthinus*, Fairm. (*goossensi*, Pic), and possibly confused with that species by Bourgeois, wanting the claw-like superior prolongation of the second anterior tarsal joint in ♂, which is very distinct (when the tarsus is viewed in profile) in a Kilimandjaro example named by him and lent me by Dr. Sjöstedt. The four specimens selected as types (3 ♂ ♂ and 1 ♀) have the elytral punctuation coarse, and sparse on the disc, while the var. *kamerunus* (5 ♂ ♂) has it closer and a little finer, and exactly as in the enormous series of *H. janthinus* from the Belgian Congo before me; these latter having the claw-like tarsal development to the second tarsal joint. *H. inæqualis* and *H. semilævis* are allied insects with toothed anterior trochanters and simple anterior tarsi in ♂, the former having narrower and more strongly appendiculate intermediate tibiæ, and the latter much shorter elytra.

64. *Hapalochrus kenyensis.*

? *Apalochrus semicupreus*, s.sp. *kenyensis*, Pic, Mélanges exot.-entom. xxxi. p. 10 (♂ ♀) (Oct. 1919).

♂. Rather short, fusco-hirsute, brilliant bluish-green, the elytra cyaneous, the antennæ (the lower surface of joints 1 and 2 excepted) and legs black or metallic. Head and prothorax rather small, almost smooth, the latter transverse, sparsely punctulate at the sides; antennæ feebly serrate; elytra gradually widened to beyond the middle, blunt at the tip, densely, coarsely, rugosely punctate; anterior trochanters without tooth; anterior femora subangulate beneath; anterior tibiæ moderately thickened, sinuate, compressed and obliquely excavate towards the apex; anterior tarsi simple, joint 2 short; intermediate tibiæ greatly thickened, short, convex and rounded externally, excavate at the apex beneath, and with a short compressed lobe at the inner apical angle.

Length 3½, breadth $1\frac{9}{10}$ mm.

Hab. E. AFRICA, S.E. slopes of Kenya, alt. 6000–7000 ft. (*S. A. Neave*: ii. 1911), Kabete (*T. J. Anderson*: 25. x. 1917).

Two males, possibly referable to *H. kenyensis*, Pic, and the only species before me from the Kenya region fitting his very incomplete diagnosis. Smaller than *H. semicupreus* (No. 33), the head and prothorax almost smooth, the elytra a little more parallel, the ♂ with simple anterior tarsi, and wanting the tooth to the anterior trochanters and the angular dilatation of the anterior tibiæ.

The ♀, according to Pic, has posteriorly dilated elytra, and it may be represented amongst the variable series of specimens of that sex placed by me under *H. amplipennis*, Harold.

65. *Hapalochrus amplipennis.*

♀. *Hapalochrus amplipennis*, Harold, Monatsb. Akad. Wiss. Berlin, 1878, p. 220; Fairm. Ann. Soc. Ent. Fr. 1887, p. 158.

Hapalochrus (*Paratinus*) *amplipennis*, Bourg. in Sjöstedt's Kilimandjaro-Meru Exped. i. Abt. 7, No. 10, p. 133 (♂ ♀) (1908).

♂. Antennæ long, rather slender, joints 3–9 elongate, 2 (=3 of Harold) longer than 3; anterior trochanters unarmed; anterior femora hollowed in their outer half beneath; anterior tibiæ widened and compressed, angularly dilated or dentate at about the middle, and deeply, obliquely excavate immediately beyond this; anterior tarsal joint 1 longer than 2, 2 short, simple; intermediate tibiæ greatly thickened, subtriangular, convex and rounded externally, excavate beneath, and furnished with a rather broad, short, compressed lobe at the inner apical angle; elytra narrow at the base, rapidly widened to beyond the middle, and bluntly rounded at the apex; wings ample.

♀. Elytra inflated and more rounded at the sides; wings much reduced in size.

Length $3\frac{3}{4}$–$5\frac{1}{2}$, breadth $2\frac{1}{10}$–3 mm. (♂ ♀.)

Hab. E. Africa, Kitui (*type of Harold*), Lake Mutandu in Uganda (*C. H. Marshall*: 10. iii. 1911 : ♂ ♀), Ruwenzori (*Scott Elliot*: ♀), S. foot of Mt. Elgon, S.E. slopes of Kenya, E. foot and slopes of Aberdare Mts., Kikuyu Escarpment, S.E. Buddu, S.E. Ankole (*S. A. Neave*: ♂ ♀), Nairobi (*Dr. A. D. Milne*: ♂; *S. A. Neave*: ♀), Ruiru (*T. J. Anderson*: ♂), Narok, Masai Reserve (*Capt. A. O. Luckman*: ♂ ♀), Embu (*Orde-Brown*: ♀), Kilimandjaro, Meru, Kibonoto (*Dr. Sjöstedt*: ♂ ♀), Ukamiberge (*Mus. Brit.*: ♀), Ruanda district (*Dr. C. H. Marshall*: ♀).

There is a long and variable series of this species, including a dozen males, in the British Museum, and a ♂ and ♀ of it from Kibonoto named by Bourgeois have been sent me by Dr. Sjöstedt for examination. The upper surface is usually cyaneous or bluish-green, the prothorax being brassy-cupreous in the pair from Lake Mutandu. Some of them have the prothorax distinctly sinuate before the base, and one or two others have the elytra obsoletely unicostate. The head and prothorax are almost smooth, and the elytra are very coarsely punctured. The elytra in the females vary in length, probably according to the development of the wings, one of the three from Elgon having them considerably longer than the others. The Mutandu specimens approach *H. semicupreus*, Pic, as here recognized. *Laius latipennis*, Pic (1906), type ♀, from Rodolph, E. Africa, is queried by Bourgeois as synonymous with *H. amplipennis*, Harold; but, if correctly identified by me, it is separable from the latter by the elongate, narrow third antennal joint in that sex, and therefore belongs to *Heterolaius* (*cf. ante*, p. 179).

66. *Hapalochrus modestus.*

Hapalochrus (*Paratinus*) *modestus*, Bourg. in Sjöstedt's Kilimandjaro-Meru Exped. i. Abt. 7, No. 10, p. 134 (♂ ♀) (1908).

♂. Anterior tibiæ feebly dilated at the middle, the dilated portion not produced into a tooth; the other characters as in *H. amplipennis*, Harold.

Hab. E. Africa, Kilimandjaro and Meru, Kibonoto (*Dr. Sjöstedt*: ♂ ♀).

Dr. Sjöstedt has kindly lent me a pair of this species. Apart from the less dilated anterior tibiæ of the male, they have the prothorax more constricted at the base than usual in *H. amplipennis*, a long and variable series of which (including a pair named by Bourgeois) is before me.

67. *Hapalochrus scabrosus*, sp. n.

♀. Elongate, opaque above, shining beneath, clothed, the legs included, with very long, erect, blackish hairs; bluish-green, the dorsal surface of the abdomen (the last three segments excepted) red, the antennæ (the basal joint in part excepted), palpi, and legs black or metallic. Head and prothorax rather small, densely scabroso-punctulate, the latter broader than long, abruptly, sinuately narrowed posteriorly, and with shallow basal depression. Elytra long, somewhat inflated, about as broad as the prothorax at the base, widened to about the middle, the sides rounded from a little below the base to the apex; coarsely, confluently, rugosely punctate, the raised interspaces dull, densely punctulate. Wings abbreviated.

Length 4¾, breadth 2½ mm.

Hab. E. Africa, Mau, Masai Reserve (*Capt. A. O. Luckman*: 7. i. 1914).

One specimen, injured by pinning. Differs from the other species with subapterous females, *H. amplipennis*, *modestus*, *semicupreus*, &c., by the opaque upper surface, the densely punctulate, scabrous head and prothorax, and the very coarsely, confluently punctured elytra, the insect thus having a different aspect from any of its allies. It is one of several new Malacoderms discovered by Capt. Luckman in Central Africa.

Key to the Asiatic Species.

♂♂.

25 (26). Antennæ flabellate; anterior tarsal joint 2 prolonged above; body metallic. [Malayan region.] .... Species 68, 69.
26 (25). Antennæ serrate; anterior tarsal joint 2 prolonged above.
27 (32). Elytra maculate.
28 (29). Intermediate trochanters scaphiform (No. 70) or produced into a downwardly-directed lobe (No. 71); intermediate tibiæ slightly thickened, sinuate within. [India, Burma, &c.]. Species 70, 71.
29 (28). Intermediate trochanters and tibiæ simple.
30 (31). Anterior trochanters toothed. [India.] ...... Species 72.
31 (30). Anterior trochanters unarmed. [Persia.] .... Species 73.
32 (27). Elytra not maculate; body metallic; anterior trochanters, with a short tooth; intermediate tibiæ incrassate and appendiculate. [Arabia.] Species 74.

68. *Hapalochrus luzonensis.*

? *Hapalochrus luzonensis*, Pic, Mélanges exot.-entom. x. p. 15 (♂) (Oct. 1914).

♂. Elongate, subparallel, robust, shining, thickly clothed with rather coarse whitish pubescence, with long erect hairs intermixed; bluish-green, the oral organs, basal joints of antennæ, legs, and abdomen testaceous, the rest of the antennæ black. Head and prothorax closely punctulate; the latter convex, wider than the head, transversely subquadrate as seen from above, rounded at the sides as seen laterally, uneven, broadly hollowed down the middle posteriorly, and with an oblong prominence in the centre of the depression; antennæ long, strongly flabellate from the third joint. Elytra long, at the base not broader than the prothorax, slightly widened posteriorly, rounded at the apex; densely, finely, rugulosely punctate. Anterior tibiæ thickened, strongly, simply sinuate within, hollowed beneath; anterior tarsal joints 1 and 2 thickened, subequal in length, 2 extending over base of 3 and nigro-pectinate at the tip; intermediate tibiæ very stout, broadly dilated, convex, slightly sinuate externally, almost straight on their inner edge, deeply sulcate beneath, without trace of lobe at the inner apical angle.

♀. Antennæ much shorter, serrate from joint 2 onward; prothorax much smoother on the disc; femora partly infuscate.

Length 4½–5, breadth 2 mm. (♂ ♀.)

Hab. PHILIPPINES (*Mus. Brit.*: ♀), Luzon (*type of Pic*: ♂), Mindoro (*E. Everett*: ♂).

The above description is taken from a pair in the British Museum. The ♂ agrees fairly well with Pic's diagnosis of *H. luzonensis*, except that he makes no particular allusion to the greatly thickened intermediate tibiæ, these (and the posterior pair also!) being given as "épaissies." The present insect is narrower and less convex than the African *H. sjöstedti* and *H. simoni*, and the pale legs, &c., separate it from *H. mirabilis*, Pic.

69. *Hapalochrus mirabilis.*

♂. *Hapalochrous mirabilis*, Pic, L'Echange, xxiii. p. 134 (1907).

♂. Antennæ long, strongly flabellate from joint 4 onward; anterior tarsal joints 1 and 2 thickened, 2 projecting over the base of 3; anterior tibiæ sinuate within; intermediate tibiæ simple.

♀. Antennæ shorter, serrate.

Length 3½–4¾, breadth 1⅘–2¼ mm. (♂ ♀.)

Hab. TONKIN, Dap-Can (*type of Pic*); PENANG (*Mus. Brit.*); ? INDIA (*Mus. Brit.*).

Five males and one female, apparently referable to *H. mirabilis*, are contained in the British Museum. These specimens are all from the Bowring collection, received in 1863, but the locality "India" requires confirmation. An elongate, narrow, very shining, cinereo-pubescent, bluish-black form, with cyaneous, densely, very finely punctate elytra; the prothorax almost smooth, transversely excavate in the middle at the base, and obsoletely canaliculate anteriorly; the antennæ and legs black.

70. *Hapalochrus fasciatus.*

Cantharis fasciata, Fabr. Ent. Syst. i. 1, p. 218 (1792).
Apalochrus lætus, Erichs. Entomographien, p. 51 (1840) (part.); Bourg. Compt. Rend. Soc. Ent. Belg. xxxv. p. cxl (1891).
Apalochrus fasciatus, Gorh. Ann. Soc. Ent. Belg. xxxix. p. 317 (1895).
Apalochrus depictus, Gorh. loc. cit. (♂ ♀).

♂. Anterior femora incrassate; anterior tibiæ slightly hollowed towards the apex within; anterior tarsal joints 1 and 2 stout, 1 transverse, 2 elongated and extending over 3 to its apex, nigro-pectinate at the tip; intermediate trochanters (Pl. VIII. fig. 32) elongated, boat-shaped, pointed at the tip; intermediate femora stout, strongly incrassate towards the base; intermediate tibiæ moderately thickened, deeply excavate towards the apex within, the trochanter being received into the cavity when the tibiæ are drawn inward.

Hab. INDIA, Nepal, Bengal, Lohadugga, Berkampur, &c. (*Mus. Brit.*), Sitapur in W. Almora (*H. G. Champion*), Calcutta (type of *depictus*), Kanara, Belgaum (*H. E. Andrewes*), Kunbir Nowaloti, Tetara, Kurseong (*sec. Bourgeois*).

Gorham correctly stated that two species had been confused by Erichson under the name *H. fasciatus*, but he omitted to note that the ♂-characters of the insects he called *H. fasciatus* and *H. depictus* were precisely similar. The latter was based upon specimens (♂ ♀) with the cyaneous elytral marking much reduced in size, those from Belgaum and Kanara determined by him as *H. fasciatus* having them much more extended. This character, and the development of the prothoracic vitta, which is sometimes reduced to a small spot (but never wholly absent as in *H. lætus*, F.), proves to be of no importance when a long series is examined. Himalayan examples belong to the form *depictus*, the types of which were said to be from Calcutta.

71. *Hapalochrus lætus.*

Malachius lætus, Fabr. Syst. Eleuth. i. p. 305 (1801).
Apalochrus lætus, Gorh. Ann. Soc. Ent. xxxix. p. 317 (♂ ♀) (1895).

♂. Intermediate trochanters (Pl. VIII. fig. 27) produced into a stout, downwardly-directed lobe, which is abruptly truncate at the tip; the other characters as in *H. fasciatus.*

Hab. BURMA, Toungoo, Shuegyin, Tharrawaddy (*coll. Andrewes*); ? SUMATRA (*type of Fabricus*).

Fourteen examples seen, including five males, nearly all in very bad condition. Extremely like the darker form of *H. fasciatus* from Kanara and Belgaum, and only separable therefrom by the wholly rufescent prothorax and the peculiar form of the ♂ intermediate trochanters. Mr. Andrewes has been kind enough to lend me the specimens of these two species which were examined and reported upon by Gorham in 1895.

72. *Hapalochrus malabarensis.*

Hapalochrus malabarensis, Pic, Le Naturaliste, xxv. p. 81 (1903).
♂. *Apalochrus* (*Spinapalochrus*) *malabarensis*, Pic, Mélanges exot.-entom. xxx. p. 12 (June 1919).

♂. Antennæ long, stout, serrate, tapering towards the tip, joint 2 much longer than 3; anterior trochanters armed with a long, slender tooth; anterior tibiæ slender, curved, hollowed towards the apex within, the apical portion slightly thickened; anterior tarsal joints 1 and 2 stout, short, subequal in length, 2 extending over base of 3; intermediate tibiæ hollowed from about the middle to near the apex within.

Length $4\frac{1}{2}$, breadth 2 mm.

Hab. INDIA, Mahé, Malabar (*type of Pic*), Ceylon (*Col. Yerbury*).

A male from Ceylon, presented to the British Museum in 1892, agrees with Pic's original description, except in its smaller size and the entirely black posterior legs. This insect has the head black, the prothorax rufescent, and the elytra bluish-black, with a common, narrow, median fascia and a spot at the tip testaceous. *H. malabarensis* and *H. rufofasciatus*, Pic, the latter from Tonkin (1919), are referred to a new subgenus, *Spinapalochrus*, by him, the characters [♂] given for it being "Coxis an icis dentatis, pedibus simplicibus," the trochanters having evidently been mistaken for the coxæ and the anterior tarsal structure overlooked. The toothed trochanters is a character to be found in various metallic African *Hapalochri*, and the subgenus, if adopted, would separate many closely allied insects.

73. *Hapalochrus persicus*, sp. n.

♂. Elongate, depressed, rather narrow, subparallel, closely pubescent, the prothorax shining, the rest of the upper surface duller or opaque; green or brassy-green, the anterior margin of the head, the oral organs and antennæ (the more or less infuscate outer half of the latter excepted), the prothorax with a large spot or transverse patch on each side in front (sometimes connected along the anterior margin or reduced to a narrow streak), the elytra with a large, common, triangular, scutellar patch, a narrow, angulate, post-median fascia, and a common, transverse space at the apex (the basal and post-median markings sometimes narrowly connected along the suture and the apical one usually extending outwards along the apical margin), the legs (a small black patch at the apices of the femora, and the apices of one or more of the tibiæ, excepted), and the under surface in part, testaceous. Head densely, rugulosely punctured, transversely depressed anteriorly; antennæ rather stout, moderately long, serrate, joints 2 and 3 wider than 1. Prothorax broader than long, as wide as or wider than the head, the sides rounded and converging posteriorly, the transverse basal sulcus deep; finely punctured at the sides, smoother on the disc. Elytra long, slightly widening posteriorly, flattened on the disc; densely, very finely, rugulosely punctate. Anterior tarsal joints 1 and 2 rather stout, extending over the base of 3, subequal in length, 2 slightly swollen, rounded and nigro-pectinate at the tip; anterior and intermediate tibiæ slender, simple.

♀. Antennæ shorter and more slender, subserrate.

Length 5–6, breadth $1\frac{9}{10}$–$2\frac{1}{10}$ mm. (♂ ♀.)

Hab. Persia, Kurdistan in Turcomania (*Millingen, ex colls. Fry and Sharp*).

Four specimens, two of each sex. Near *H. fedtschenkoi*, Solsky (1882), and *H. turkestanicus*, Pic (1907), from Northern Asia, but with different prothoracic and elytral markings, &c. The elytra may be said to have a large, elongate triangular patch on the basal half (nearly or quite reaching the suture), and a broad, common, angulate, subapical fascia, metallic or black, and the rest of their surface testaceous.

74. *Hapalochrus millingeni*, sp. n.

♂. Elongate, narrow, very shining, cinereo-pubescent; bluish-green, the antennæ (the testaceous lower surface of the basal joints excepted) black; the legs testaceous, with a streak along the upper edges of the anterior and intermediate femora, the posterior femora entirely, and the tips of the tarsi, infuscate or metallic. Head closely punctate; antennæ moderately long, rather stout, serrate. Prothorax small, transverse, punctured at the sides, smooth on the disc. Elytra long, widening from the base to near the apex, rounded at the tip, depressed on the disc below the base; densely, finely punctate. Anterior trochanters with a short tooth; anterior femora dentate at the middle beneath; anterior tibiæ thickened, angularly dilated at about the middle above, and obliquely compressed, and with a diaphanous space on its inner edge, towards the apex; anterior tarsal joints 1 and 2 slightly thickened, 2 shorter than 1 and narrowly extended over the base of 3; intermediate tibiæ (Pl. VIII. fig 31) much thickened, deeply sinuate within from a little beyond the middle to the apex, and with a curved retractile lobe visible in the cavity.

♀. Head smoother; antennæ shorter and more slender, subserrate; legs darker, the tibiæ fusco-testaceous.

Length 3, breadth $1\frac{1}{3}$–$1\frac{1}{2}$ mm.

Hab. ARABIA, Yemen (*Millingen, ex coll. Fry*).

One pair, from the Fry collection. A very small, narrow, posteriorly widened, shining, bluish-green form, not unlike the African *H. mashunus*, Gorh., and with somewhat similar intermediate tibiæ in ♂, the anterior tibiæ angularly dilated, and the second joint of the anterior tarsi with a claw-like projection, in the same sex.

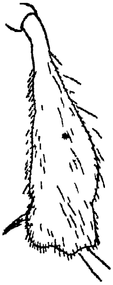
75. *Hapalochrus opulentus.*

Hapalochrus opulentus, Péring. Trans. S. Afr. Phil. Soc. vi. 2, p. 46 (♂ ♀) (1892).

♂. Very like *H. abyssinicus*, Harold (No. 13) (=*major*, Pic); head narrower, green to the anterior margin, densely punctured; elytra densely, very finely punctate; legs wholly testaceous; intermediate tibiæ similarly swollen, the dentiform pencil of hairs [not mentioned by the author] arising from near the inner apical angle much narrower; anterior tarsal joint 2 extending over 3.

Hab. S. AFRICA, Ovampoland and Transvaal.

Dr. Péringuey has kindly lent me the types of this species for examination, and we take the opportunity of giving a figure of the intermediate tibiæ of the ♂. In the arrangement here adopted, *H. opulentus* should be numbered 17 (*a*); see also pp. 180, 191.



Hapalochrus opulentus, Péring., ♂.

EXPLANATION OF PLATE VIII.

Fig. 1. *Hapalochrus simoni*, Pic, ♂; anterior leg.
Fig. 2. ,, *dasytiformis*, sp. n., ♂; anterior leg.
Fig. 3. ,, *festivus*, Er., ♂; intermediate tibia.
Fig. 4. ,, *abyssinicus*, Har., ♂; intermediate tibia.
Fig. 5. ,, *atratus*, sp. n., ♂; anterior leg.
Fig. 6. ,, *lobipes*, sp. n., ♂; anterior leg.
Fig. 7. ,, *sumtuosus*, Boh., ♂; anterior tibia and tarsus.
Fig. 7 *a*. ,, ,, ,, var., ♂; anterior tibia.
Fig. 7 *b*. ,, ,, ,, ♂; intermediate tibia.
Fig. 8. ,, *elgonensis*, sp. n., ♂; intermediate tibia.
Fig. 9. ,, *longior*, Pic, ♂; intermediate tibia.
Fig. 9 *a*. ,, ,, ♂; intermediate femur and tibia, from beneath.
Fig. 10. ,, *constrictipes*, sp. n., ♂; intermediate tibia.
Fig. 11. ,, *malachioides*, Fairm., ♂; intermediate tibia.
Fig. 12. ,, *uncinatus*, sp. n., ♂; intermediate tibia.
Fig. 13. ,, *bilamellatus*, sp. n., ♂; intermediate tibia.
Fig. 14. ,, *cochleatus*, sp. n., ♂; intermediate tibia.
Fig. 15. ,, *spectabilis*, Ancey, ♂; intermediate tibia.
Fig. 16. ,, *nitens*, Gorh., ♂; intermediate tibia.
Fig. 17. ,, *clavicornis*, sp. n., ♂; intermediate tibia.
Fig. 18. ,, *dilaticornis*, sp. n., ♂; intermediate tibia.
Fig. 19. ,, *appendicifer*, Pic, ♂; intermediate tibia.
Fig. 20. ,, *longicornis*, sp. n., ♂; intermediate tibia.
Fig. 21. ,, *fissipes*, sp. n., ♂; intermediate tibia.
Fig. 22. ,, *inchoatus*, sp. n., ♂; anterior leg.
Fig. 22 *a*. ,, ,, ♂; intermediate tibia.
Fig. 23. ,, *azureus*, Er., ♂; intermediate tibia.
Fig. 24. ,, *mashunus*, Gorh., ♂; intermediate tibia, from beneath.
Fig. 25. ,, *laciniosus*, sp. n., ♂; intermediate tibia, from beneath.
Fig. 26. ,, *hamatus*, sp. n., ♂; intermediate leg.
Fig. 27. ,, *lætus*, F., ♂; intermediate trochanter, femur, and tibia.

Fig. 28. *Hapalochrus angulatus*, sp. n., ♂; intermediate tibia.
Fig. 29. " *triangularis*, sp. n., ♂; intermediate tibia.
Fig. 30. " *constricticollis*, sp. n., ♂; intermediate tibia.
Fig. 31. " *millingeni*, sp. n., ♂; intermediate tibia.
Fig. 32. " *fasciatus*, F., ♂; intermediate trochanter, femur, and tibia.

Alphabetical numbered list of species of Hapalochrus *enumerated in this paper; those marked with an asterisk are treated as new.*

abyssinicus, 13.
ærosus, 30.
*amadiensis, 52.
amplipennis, 65.
*angulatus, 47.
appendicifer, 29.
*armatus, 54.
*atratus, 11.
azureus, 38.
*bilamellatus, 18.
*caudatus, 56.
*cinerascens, 42.
*clavicornis, 22.
*cochleatus, 19.
*confusus, 55.
*constricticollis, 62.
*constrictipes, 15.
*cyaneonitens, 63.
*cyanocephalus, 48.
*dahomeyanus, 27.
*dasytiformis, 10.
deformipes, 2.
densatus, 41.
*dilaticornis, 23.
*dollmani, 58.
*elgonensis, 14.
fasciatus, 70.
festivus, 5.
*filicornis, 46.
*fissipes, 37.
*foveiger, 44.
*furcatus, 50.
*fusicornis, 26.
*hamatus, 45.
*inæqualis, 60.
*inchoatus, 25.
*irregularis, 51.
janthinus, 43.
kenyensis, 64.
*laciniosus, 40.
lætus, 71.
*lobipes, 9.
*longicornis, 31.
longior, 3.
luzonensis, 68.
malabarensis, 72.
mashunus, 39.
maynei, 57.
*millingeni, 74.
mirabilis, 69.
modestus, 66.
*mollis, 53.
nitens, 21.
nobilis, 4.
opulentus (17 *a*), 75.
*patruelis, 32.
*persicus, 73.
*platycerus, 35.
*ramulosus, 12.
*rhodesianus, 49.
*rugosus, 36.
*scabrosus, 67.
semicupreus, 33.
*semilævis, 59.
simoni, 8.
sjöstedti, 6.
spectabilis, 20.
sumtuosus, 1.
testaceicornis, 24.
*trapeziderus, 7.
*triangularis, 61.
tschoffeni, 28.
*uncinatus, 17.
viridicollis, 34.

SYNONYMS AND VARIETIES.
cæruleus, 38.
conradti, 16.
? cribrarius, 38.
depictus, 70.
? duvivieri, 38.
? erichsoni, 1.
goossensi, 43.
? jansoni, 3.
*kamerunus, 63.
major, 13.
martini, 29.
moloensis, 33.
nyassensis, 1.
reductus, 1.
signaticollis, 1.
simplicipes, 6.

XXXVIII.—*New Chilopods of the Genus* Mecistocephalus.
By Ralph V. Chamberlin, Cambridge, Mass., U.S.A.

[Plates IX.-XII.]

Mecistocephalus celebensis, sp. n.
(Pl. IX. figs. 1-9.)

Body fulvous to light brown, without darker markings or mottling. Head and prehensorial segment chestnut. Antennæ light chestnut. Legs fulvous.

Head nearly 1·75 times longer than wide. Sides straight and only slightly converging, subparallel from frontal suture back to the beginning of the more abrupt posterior narrowing. Caudal margin truncate, wide. Anterior margin straight, less angularly produced forward than in *cephalotes* (Pl. IX. fig. 1). No non-areolate chitinous spots in front of paired clypeal areas.

Labrum suggesting that of *M. cephalotes*, but the median piece somewhat broader, less overlapped toward caudal end, and the lateral pieces incurving at mesal ends (*cf.* Pl. IX. figs. 2 & 10). The free margin of each lateral piece incurves more at outer end, where also the fringe of hairs is exposed for a considerable distance, whereas this is wholly covered in *cephalotes* and related forms.

Mandible with twelve pectinate lamellæ, of which the last two are successively much reduced in length and are more membranous (*cf.* Pl. IX. fig. 4). First lamella with seven uniform teeth, these stouter than those of the other two lamellæ (Pl. IX. fig. 5). Teeth of ordinary lamellæ long at distal end, but from near middle of lamella proximad strongly reduced (Pl. IX. fig. 6). A median lamella with thirty-seven or thirty-eight teeth.

Coxosternum of second maxillæ with posterior angles divergent, acute. Segmental pore large, subcircular. Ectal angles of coxæ of first maxillæ scarcely produced, subrectangular or but slightly acute (Pl. IX. fig. 3).

Exposed part of prosternum 1·36 times wider than long. Anterior border of prosternum with the usual two rounded teeth. Femuroid with two teeth, both of which are blunt, the distal one the stouter. Two next joints each with a rounded tooth, of which that of the second is obviously stouter. Claw with a small but distinct tooth at base above the ordinary protuberance (Pl. IX. fig. 7).

First legs exceptionally small, the second being two and two-thirds longer.

Impressions of anterior sternites furcate, the angle between branches obtuse, becoming more so in going caudad, the two branches in some forming nearly a straight line, disappearing in posterior region as usual (*cf.* Pl. IX. figs. 8 & 9).

Pregenital segment with sternite somewhat shield-shaped, narrowed in front of caudal end. Coxopleuræ with numerous small pores uniformly arranged, less numerous minute ones intervening. Last legs about two and a fourth times as long as the penult ones.

Number of segments, 49.

Length, to 60 mm.; width of first tergite 3 mm.

Locality.—Celebes: Bua-Kraeng, 5000 ft. (*Frühstorfer*, Feb. 1896). Type and paratypes in U.S. National Museum; paratypes also in Mus. Comp. Zool. at Cambridge, Mass.

Mecistocephalus philippinus, sp. n.
(Pl. IX. fig. 11; Pl. X. figs. 1–8.)

Colour brown, darkened by a dense network or marbling of black, which is also evident in the pleural region and less pronouncedly on the sternites. Head with antennæ and prehensorial segment chestnut. Legs fulvous.

Head proportionately broader than in *celebensis* and *cephalotes*, being 1·6 times longer than wide. The anterior margin is weakly bowed forward, less nearly truncate than in *celebensis* and less produced than in *cephalotes*. The sublateral teeth or spurs are farther forward than usual (Pl. X. fig. 1).

Antennæ strongly attenuated, the articles proportionately rather broad, the sixth being typically as broad distally as the length. Ultimate article decidedly longer than the preceding one.

Exposed portion of median piece of labrum conspicuously narrowed caudad. Free margin of each lateral piece straighter than in *celebensis* and *cephalotes*, not bending in at mesal ends, as in the latter species, and with no line of hairs showing at outer ends.

Mandible with thirteen or fourteen primary lamellæ. First lamella with seven stout and subuniform teeth. Mesal margin of mandible below this lamella with only three to five weak serrations below the angle (Pl. X. fig. 4). A median lamella has the teeth of the distal region long and slender, those of proximal half much reduced, though rather longer than in *celebensis*; teeth in number near forty-three to forty-five. The abdental edge of the ordinary lamellæ has a characteristic obtuse angulation near base (Pl. X. fig. 5).

Maxillæ resembling those of *celebensis*; but posterior processes of coxosternum of second pair less acute, more rounded, slightly bending mesad at caudal end, the segmental pore triangular in outline, a more chitinous median band separated off from the lateral areas. Coxæ of first maxillæ with ectal angles scarcely produced, subrectangular (Pl. X. fig. 3).

Prosternum with teeth of anterior margin well-developed. Femuroid with two teeth, which are subacute and of which the second or more distal is characteristically much stouter and longer, this being a feature by which the species is ordinarily readily recognizable. Next two joints also armed, the tooth of the second the larger. Claw with a distinct tooth at base above the ordinary prominence (Pl. X. fig. 6).

Second legs twice as long as the first.

Impressions of anterior sternites furcate, the angle obtuse, the angle rather more obtuse in the more posterior of the furcate ones (Pl. X. figs. 7 & 8).

Sternite of pregenital segment trapeziform, the sides moderately converging caudad, and the plate typically abruptly much narrowed near caudal end (Pl. IX. fig. 11). Coxopleuræ with very numerous small and very small pores, the smaller ones much the more numerous. Ultimate legs about two and a fourth times as long as the penult.

Number of pairs of legs, 49.

Length 88 mm.; width of first tergite 3·2 mm.

Locality.—Philippine Is.: Luzon: Los Baños; Mt. Makeling (C. F. Baker coll.). Types and paratypes in Mus. Comp. Zool. Cambridge, Mass.

This seems to be a common species about Los Baños.

Mecistocephalus nagasaunus, sp. n.

(Pl. X. figs. 9–11; Pl. XI. figs. 1–4.)

Colour in general fulvous, more orange-coloured anteriorly. Head and prehensorial segment dark orange or light chestnut.

Head much broadest anteriorly, conspicuously narrowed caudad. Anterior margin obtusely angular, notched at middle. Posterior margin wide, very slightly convex or essentially truncate. Head 1·6 times longer than wide

(Pl. X. fig. 9). Anterior areolated band of clypeal region longer than the paired posterior areas. Sublateral teeth large, acute (Pl. XI. fig. 1).

Median piece of labrum not or scarcely overlapped laterally by the lateral pieces, moderately narrowed caudad, the caudal end triangular. Lateral pieces with caudomesal corners characteristically broadly rounded. Anterior edges of lateral pieces when produced forming a pronounced obtuse angle. Margins wholly smooth (Pl. XI. fig. 2).

Posterior corners of coxosternum of second maxillæ acutely produced; entire region caudad of pores and a broad median band areolate. Pores narrowly elliptic. Ectal angles of coxæ of first maxillæ elevated and broadly rounded (Pl. XI. fig. 3).

Mandible with six lamellæ, of which the first has six teeth. Mesal corner below first lamella acutely produced, the margin entire (Pl. XI. fig. 4). Teeth of median lamellæ all long, not reduced at proximal end, typically near fifteen in number.

Antennæ moderately attenuated. Last article clearly longer than the penult, but shorter than the penult and antepenult together. Sixth article longer than wide at distal end, in about ratio 5 : 4.

Exposed area of prosternum wider than long, in ratio 9 : 7. Anterior margin with the two teeth normally developed. Femuroid with two teeth, these rather broad, low and rounded, the distal one the larger. Next two joints also bearing teeth, of which the second is decidedly the larger. Claw with angulation at base, but without distinct tooth above this (Pl. X. fig. 10).

First leg about three-fifths as long as the second.

Sternal impressions of anterior segments furcate, but the branches very short; angle obtuse; branches disappearing caudad as usual (Pl. X. fig. 11).

Sternite of pregenital segment broad anteriorly, strongly narrowed caudad, almost triangular, the caudal end rather narrowly rounded. Coxopleuræ with a moderate number of small pores, the total number on each side being twenty of which about twelve are visible in strictly ventral view Anal pores distinct. Last legs about twice as long as the penult.

Pairs of legs, 49.

Length about 23 mm.

Locality.—Fiji Is.: Nagasau (W. M. Mann coll.).

Type in Mus. Comp. Zool. (No. 2161).

Mecistocephalus medius, sp. n.
(Pl. XI. figs. 5–11.)

Dorsum fulvous, of slight ferruginous tinge. Legs fulvous. Head and prehensorial segment chestnut.

Head widest anteriorly, the sides moderately converging caudad, more strongly so adjacent to posterior corners. Anterior margin widely rounded. Posterior margin broad, slightly bowed (Pl. XI. fig. 5). Head in type 1·68 times longer than wide.

Median piece of labrum broadly sublanceolate. Anterior margin of lateral pieces, when projected to meet forming a straight line at middle, curving caudad of ectad at outer ends. Free margins of lateral pieces concave in ectal region, convex mesad of middle, with mesal angles as shown in Pl. XI. fig. 7. Anterior pieces only a little narrower at mesal ends than at the ectal.

Areolated area of clypeus much longer than the non-areolated posterior paired bands. Median dividing band rather wide. Sublateral teeth as shown in Pl. XI. fig. 6.

Mandible with seven lamellæ, counting the much reduced ectal one. First lamella with five characteristically long teeth (Pl. XI. fig. 9). Median lamella with about fifteen teeth, all long, the proximal ones more loosely arranged.

Areolated area of coxosternum of second maxillæ large, the median band very broad. Pores narrowly subelliptic. Ectal corners of coxæ of first maxillæ only slightly elevated, rounded. Setæ of maxillæ as shown in figure. Distal joint of palpus characteristically bluntly rounded, the claw much reduced (Pl. XI. fig. 8).

Teeth on anterior margin of prosternum very small. Claw of prehensors exceptionally slender, tooth at base prominent. Femuroid with the usual two teeth, of which the distal is the larger and projects distad of mesad. The succeeding joint bears no tooth, but the next one bears a prominent tooth at its distal edge, which projects distad of mesad (Pl. XI. fig. 10).

Impressions of anterior sternites furcate, the branches forming an obtuse angle (Pl. XI. fig. 11).

Posterior portion of body of type missing, hence the total length and the number of segments cannot be given.

Width of first tergite 1·2 mm.

Locality.—Solomon Is.: Ngi (*W. M. Mann*).

Type in Mus. Comp. Zool. at Cambridge, Mass.

This is a strongly marked species, readily recognizable by the bluntly rounded distal joint of the palpus of the second maxillæ, the form of the labrum, slender claw of the prehensors, with absence of tooth from third joint of latter, etc.

Mecistocephalus apator, sp. n.
(Pl. XII. figs. 1–6.)

Head and prehensors blackish. Body fulvous, orange in anterior region.

Head differing considerably in form from that of *monticolens*, which the species resembles, being anteriorly truncate, more gradually narrowed caudad. Posterior margin truncate. Head 1·85 times longer than wide.

The setæ of the clypeal region are similar in number and position to those of *monticolens*, as these are shown in Pl. XII. fig. 8. The sublateral spurs are stouter and less bent mesad.

Labrum somewhat similar in general form to that of the Javan *monticolens*; but the exposed part of the median piece has the sides straight or concave instead of convex, and the free margins of the lateral pieces round in cephalad at mesal ends instead of projecting in tooth-like angles (Pl. XII. fig. 2; *cf.* Pl. XII. fig. 9).

Mandible with a total of seven lamellæ. Of these the first has six stouter teeth (Pl. XII. fig. 4). A median lamella has twelve long teeth, these subuniform in length.

The areolated region of the coxosternum of the second maxillæ large, the median band broad; but in this species the non-areolated region on each side extends caudad of the segmental pores. Ectal angles of coxæ of first maxillæ moderately produced forwards (Pl. XII. fig. 3).

The teeth of the prosternum are small though distinct and larger than in *monticolens*. The two normal teeth of femuroid present. Of these the more proximal one is low, broad, and rounded; the distal one is longer and is distally subtruncate. The next two joints also armed, the tooth of the second one the larger. No distinct tooth at base of claw above the basal angulation (Pl. XII. fig. 5).

Sternal impressions simple longitudinal furrows, with no distinct furcation.

Sternite of pregenital segment trapeziform, strongly narrowed caudad. Coxopleural pores of moderate size, well separated, about twenty-five on each side.

Pairs of legs, 49.

Length of type near 35 mm.

Locality.—Bua-Kracng, 5000 ft. (*Frühstorfer*, Feb. 1896). Three specimens, U.S. National Museum.

Mecistocephalus monticolens, sp. n.
(Pl. XII. figs. 7–11.)

Dorsum light or fulvous brown with some darker marbling. Legs fulvous. Head and prehensorial segment chestnut.

Head of the usual general shape, but more strongly narrowed over posterior half than usual. Proportionately long, being 1·8 times longer than the greatest width. Anterior margin obtusely angular, the posterior subtruncate (Pl. XII. fig. 7).

Clypeal region without anterior chitinous, non-areolated spots. Sublateral teeth curving characteristically mesad (Pl. XII. fig. 8).

Median piece of labrum somewhat wedge-shaped, but the sides a little convex and the caudal end notched, projecting beyond lateral pieces. Anterior margins of lateral pieces when extended to meet forming an obtuse angle. Caudal margins concave in outer part, convex in mesal, as shown in Pl. XII. figs. 8 & 9. Anterior pieces strongly narrowed mesad.

In the type the prosternal teeth are present only as exceedingly minute rudiments. The femuroid has the usual two teeth, of which the distal is much the larger, is distally rounded, and is bent distad. The next two joints are armed with rounded teeth, that of the second being the larger. Claw with a rounded nodule above the principal basal prominence or angulation (Pl. XII. fig. 10).

The impressions of the anterior sternites scarcely truly furcate, on some there being no trace of branches, but on others very short branches are discernible, these making a more or less obtuse angle (Pl. XII. fig. 11).

Sternite of pregenital segment strongly narrowed caudad, almost triangular, the posterior end narrowly rounded, constricted a little in front of caudal end. Coxopleural pores moderately large in size and comparatively few in number, about twenty on each side in the type.

Pairs of legs, 49.

Length of type about 35 mm.

Locality.—Java: Gede, 9000 ft., Sept. 1892. U.S. National Museum.

EXPLANATION OF THE PLATES.

Plate IX.

Mecistocephalus celebensis, sp. n.

Fig. 1. Head in outline. × 14.
Fig. 2. Median region of labrum. × 195.
Fig. 3. Maxillæ, ventral view. × 23.
Fig. 4. Mandible, distal region. × 100.
Fig. 5. First lamella of mandible. × 315.
Fig. 6. Fourth lamella of mandible. × 315.
Fig. 7. Right prehensor and part of prosternum. × 14.
Fig. 8. Impression of tenth sternite. × 44.
Fig. 9. Impression of twentieth sternite. × 44.

Mecistocephalus cephalotes, Meinert.

Fig. 10. Median region of labrum. × 195. (Java.)

Mecistocephalus philippinus, sp. n.

Fig. 11. Ventral plate of pregenital segment with right coxopleura. × 24.

Plate X.

Mecistocephalus philippinus, sp. n.

Fig. 1. Head in outline. × 14.
Fig. 2. Median region of labrum. × 195.
Fig. 3. Maxillæ. × 23.
Fig. 4. First lamella of mandible. × 325.
Fig. 5. Fifth lamella of mandible. × 325.
Fig. 6. Right prehensor and part of prosternum, ventral view. × 14.
Fig. 7. Impression of tenth sternite. × 24.
Fig. 8. Impression of twentieth sternite. × 24.

Mecistocephalus nagasaunus, sp. n.

Fig. 9. Head in outline. × 45.
Fig. 10. Right prehensor and part of prosternum, ventral view. × 45.
Fig. 11. Impression of eighth sternite. × 75.

Plate XI.

Mecistocephalus nagasaunus, sp. n.

Fig. 1. Anterior region of head with maxillæ removed, ventral view. × 75.
Fig. 2. Median region of labrum. × 315.
Fig. 3. Maxillæ, ventral view. × 70.
Fig. 4. First lamella of mandible. × 775.

Mecistocephalus medius, sp. n.

Fig. 5. Head in outline, dorsal view. × 30.
Fig. 6. Anterior part of head, maxillæ removed, in ventral view. × 45.
Fig. 7. Median region of labrum. × 320.
Fig. 8. Maxillæ, ventral view. × 45.

Fig. 9. First lamella of mandible. × 350.
Fig. 10. Left prehensor with part of prosternum, ventral view. × 30.
Fig. 11. Impression of tenth sternite. × 75.

PLATE XII.

Mecistocephalus apator, sp. n.

Fig. 1. Head in outline, dorsal view. × 30.
Fig. 2. Median region of labrum. × 195.
Fig. 3. Maxillæ, ventral view. × 60.
Fig. 4. First lamella of mandible. × 380.
Fig. 5. Right prehensor and part of prosternum, ventral view. × 45.
Fig. 6. Caudal end, dorsal view. × 45.

Mecistocephalus monticolens, sp. n.

Fig. 7. Head in outline, dorsal view. × 30.
Fig. 8. Anterior region of head, ventral view, the maxillæ removed. × 45.
Fig. 9. Median region of labrum. × 195.
Fig. 10. Left prehensor and part of prosternum, ventral view. × 45.
Fig. 11. Impression on tenth sternite. × 45.

XXXIX.—*Undescribed Species of African Crane-flies in the Collection of the British Museum (Natural History)*: Tipulidæ, *Diptera*.—Part I. *Subfamily* Limnobiinæ. By CHARLES P. ALEXANDER, Ph.D., Urbana, Illinois, U.S.A.

[Concluded from p. 44.]

Trentepohlia (Trentepohlia) ugandæ, sp. n.

Mesonotal præscutum reddish brown with three darker brown stripes; pleura dark brown; halteres pale; legs brownish yellow, the posterior tibiæ with four long bristle-like hairs near the tip; wings yellowish with a solid dark area at the cord and another in the apical radial cells of the wing; abdomen dark brown, the basal segments indistinctly ringed with paler.

Female.—Length about 9 mm.; wing 8·7 mm.; hind femur 11·8 mm.; tibia 11·5 mm.; tarsus 7 mm.

Rostrum and palpi dark brown. Antennæ dark brown. Head dark brown, sparsely grey-pruinose.

Pronotum dark brown. Mesonotal præscutum light reddish brown, with three darker brown stripes, the lateral stripes less distinct than the median stripe; lobes of the scutum, scutellum, and postnotum dark brown. Propleura reddish; mesopleura and sternum dark brown. Halteres pale. Legs with the coxæ and trochanters dull yellow, the fore coxæ slightly darker; femora pale brownish yellow, not noticeably darkened at the tips; tibiæ similar, the tips a little darkened; tarsi brown; posterior femora with a series of about nine small bristles near the base, posterior tibiæ with a series of four long, slightly curved bristles before the tip. Wings yellowish, the anal cells more greyish; a broad, almost solid brown mark just beyond the origin of *Rs*, sending a narrow seam along the cord almost to the wing-margin; wing-apex in cells R_2, R_3 and the tips of *2nd* R_1, R_5, and M_2 darkened, the centre of cell R_2 being almost filled by a roughly oval, subhyaline area; a dark cloud at the fork of R_{4+5} and M_{1-2}; a narrow dark seam along vein *Cu*; veins yellowish, especially in the costal region, dark brown in the darkened areas. Venation: as in *T. exornata* Bergroth; basal deflection of Cu_1 a short distance before the fork of *M*.

Abdomen dark brownish black, the apical half of the basal segments indistinctly paler brown to produce an annulated appearance. Ovipositor with the tergal valves blackened, the tips injured in the unique type; sternal valves yellowish horn-colour, flattened, blade-like, the tips acute.

Hab. Uganda.

Holotype, ♀, Northern Buddu, altitude 3800 feet, September 16–18, 1911 (*S. A. Neave*).

Presented by the Imperial Bureau of Entomology, 1915. 57.

Type in the collection of the British Museum (Natural History).

Trentepohlia ugandæ is close to *T. exornata* Bergroth and *T. speiseri* Edwards, but is readily told by the conspicuously larger size and slightly different coloration. The wing-pattern of these three species is remarkably uniform; *T. ugandæ* agrees with *T. speiseri* and disagrees with *T. exornata* in having the dark area along the sector almost solidly brown.

Genus Lecteria, Osten-Sacken.

Lecteria laticincta, sp. n.

General coloration rich reddish brown; legs very hairy (at least in the ♀), the tibiæ with two narrow pale rings; wings hyaline with heavy, irregular cross-bands of brown, margined with darker brown; no other spots or dots on the membrane.

Female.—Length about 13 mm.; wing 11·3 mm.

Rostrum and palpi brown. Antennal scape dark brown, the flagellum paler brown; first scapal segment elongate-cylindrical, the outer face with a few long setæ; the five basal segments of the flagellum are very short and crowded, the first three being united into a fusion-segment; distal flagellar segments elongate; verticils very long and conspicuous. Head brown, strongly narrowed behind; eyes protuberent; vertex provided with long, powerful bristles.

Mesonotal præscutum rich reddish brown, indistinctly striped with darker brown and clothed with long semi-erect hairs; remainder of the mesonotum somewhat similar, the postnotum more orange. Pleura pale brown with a slight greyish cast. Halteres pale brownish yellow, the knobs dark brown. Legs clothed with conspicuous semi-erect hairs; coxæ and trochanters pale brown; femora brown with a narrow white ring at about two-thirds the length; tibiæ brown, the tips very narrowly blackened; a narrow postmedial white ring and a very narrow and indistinct subbasal ring that is indicated only by a few pale hairs at this point; metatarsi white, the tips narrowly blackened; second and third tarsal segments brown, the tips blackened; the last two tarsal segments brownish black: one or possibly more spines at the extreme base of the metatarsus; compared with the related *L. triacanthos*, Alexander, the legs are shorter and much more hairy, this latter possibly a sexual character; pale tibial bands narrower and much less distinct. Wings subhyaline, heavily and irregularly cross-banded with brown, much more extensive than the nearly hyaline ground-colour; no other spots or dots on the membrane; the bands are pale brown, narrowly marg'ned with darker brown; costal cell to beyond the origin of *Rs* darkened; the first band includes the wing-base in cells *R*, *M*, *Cu* and the outer three-fifths of cell *2nd A*, this latter connected with the second band at the origin of *Rs*; this band runs almost straight across the wing, near the end of cell *M* broadly connected with the third very broad band which occupies the cord; the last band lies just before the wing-tip and is connected with the band at the cord in cell *1st* M_2, and narrowly along the costa; the hyaline areas are thus located as follows: base of cell *2nd A*; the largest before the origin of *Rs*, running across cells *R*, *M*, and *Cu*; the next largest just before the cord in cells *R* and *M*, narrowly separated by *Sc* from a slightly more yellowish area in the costal cell immediately above *Rs* ; other areas in the ends of cells *Cu* and *1st A* ; beyond the cord in cells *2nd* R_1 to R_5 ; a small spot in the end of cell R_3 ; outer two-thirds of cell M_1 largely pale ; a large rounded spot near the end of cell Cu_1 ; tiny white spots before the arculus, at the end of cell *2nd* M_2 and near the base of cell M_3 ; veins dark brown. Venation : *Rs* short, less than R_2 ; petiole of cell M_1 very short, but little longer than *m* ; basal deflection of Cu_1 a little before mid-length of cell *1st* M_2.

Abdominal tergites yellowish orange, variegated with reddish, the margins cinnamon-brown ; pleural membrane dark brown ; sternites orange-yellow ; terminal segments dark brown. Ovipositor with the valves dark brown, the tergal valves broadly tipped with horn-colour, slightly upcurved at the tips ; sternal valves straight, slender.

Hab. Southern Nigeria.

Holotype, ♀, Akwete, May 13, 1910 (*J. J. Simpson*).

Type in the collection of the British Museum (Natural History).

Lecteria laticincta may be readily distinguished from the closely allied *L. triacanthos*, Alexander, and *L. simpsoni*, sp. n., by the broader bands on the wing and the entire absence of small spots and dots in the hyaline interspaces.

Lecteria simpsoni, sp. n.

Similar to *L. triacanthos*, Alexander, but the wings longer and narrower, with darker interrupted cross-bands and comparatively few dots in the interspaces.

Male.—Length 14·5 mm. ; wing 13·5 mm., its greatest width 3·2 mm.

Closely related to *L. triacanthos*, from which it differs as follows :—

Legs with the pale bands on the femora and tibiæ more yellow than white (tarsi broken). Wings narrower, the large brown spots on the wings much darker, this effect produced by the much broader dark margins that surround the spots, the pale centres often indistinct ; these large spots are broken up so that they appear as interrupted bands ; the spots occur at the origin of *Rs* ; fork of *Rs* narrowly connected with a large seam along the cord ; a large, somewhat isolated spot at *r* and the fork of R_{2+3} ; another spot at the tip of R_2 ; the small dots on the wing are relatively few in number, much fewer than in *L. triacanthos* ; thus in cell *C* there are but six or seven small scattered spots ; none in cell *R* proximad of the spot at the origin of *Rs* ; only two or three in cell *R* between the large areas and similarly restricted in the remaining cells of the wing. Venation: this shows cell *1st M_2* and all the posterior cells of the wing longer and narrower due to the long narrow shape of the wing.

Abdomen with the caudal margins of the tergites narrowly blackened.

Hab. Southern Nigeria.

Holotype, ♂, Ikotekpene, May 19, 1910 (*J. J. Simpson*).

Type in the collection of the British Museum (Natural History).

The species is dedicated to the collector, Dr. J. J. Simpson, whose collecting in West Africa has added many interesting species to the British Museum.

Lecteria pluriguttata, sp. n.

General coloration pale brownish or greyish buff, the head and thorax with a narrow, dark brown, capillary line; wings pale brownish grey with abundant brownish and greyish dots in all the cells.

Male.—Length 28·5 mm.; wing 18 mm.; abdomen alone about 22 mm.

Rostrum and palpi dark brown. Antennæ with the first scapal segment dark brown, greyish-pruinose; second segment dark brown; three basal flagellar segments light yellow, the remainder of the flagellum dark brown with long, conspicuous verticils. Head with the convex light brownish grey with a conspicuous dark brown median stripe and somewhat shorter lateral stripes.

Pronotum greyish buff, the scutum with a narrow, brown, median line, the scutellum with two brown spots. Mesonotal præscutum with the ground-colour dark brown with three broad, light greyish-buff stripes, the median stripe split for about two-thirds its length by a transversely impressed capillary brown line: pseudosutural foveæ conspicuous, brown; scutum obscure yellowish buff with the median depression broad, the lobes indistinctly marked with darker; scutellum projecting, pale buffy; postnotum similar; a more or less distinct capillary brown line extending from the suture to the base of the abdomen. Pleura pale testaceous with a more or less distinct broad longitudinal stripe, most distinct in the paratype. Sternum dark brown. Halteres dark brown, the base of the stem and the knobs conspicuously light yellow. Legs with the coxæ pale grey, their outer faces more or less infuscated; trochanters brown;

femora pale brown, more yellowish basally, the tips broadly darker brown; tibiæ similar, the tips narrowly dark brown; tarsi dark brown: legs with conspicuous semi-erect hairs; no spines at base of metatarsi. Wings pale brownish grey, the costal and subcostal cells more yellowish; the entire wing-surface is densely sprinkled with small brown and grey dots that are of nearly uniform size throughout; these occur in all the cells of the wing, but appear to be somewhat more crowded proximad of the cord. Venation showing some variation; in the type, R_2 is shorter: basal deflection of R_{4+5} longer; cell 1*st* M_2 hexagonally rectangular, the fusion of M_3 and Cu_1 longer than the basal deflection of Cu_1; petiole of cell M_1 longer than the cell. In the paratype the opposite of the above conditions hold; it may be that two species are involved, but this seems scarcely probable.

Abdomen obscure yellow, the tergites narrowly and indistinctly margined with brown; segments seven to nine more uniformly brown. Male hypopygium with the ninth tergite not darker than the remainder of the hypopygium, the surface dull, the caudal margin deeply bilobed, the adjacent lobes rounded and provided with long yellowish bristles.

Hab. Southern Nigeria.

Holotype, ♂, Ilesha, March 4, 1910 (*J. J. Simpson*).

Paratype, ♀, Ibadan, November 21, 1913 (*W. A. Lamborn*).

Type presented by the Entomological Research Committee. 1910. 222; paratype, 1916. 48.

Lecteria pluriguttata is readily told from its close allies (*L. africana*, Alexander, *L. atricauda*, Alexander) by the multiguttate wings.

Genus CLYDONODOZUS, Enderlein.

Clydonodozus puncticosta, sp. n.

Head black, the front and anterior part of the vertex golden-pollinose; mesonotum reddish brown, the præscutum with two indistinct brown stripes; femora dull yellow, the tips narrowly dark brownish black; wings dull greyish, the costal region more yellowish; costal cell with about ten spurs and cross-veins extending from costa, these conspicuously seamed with brown; cord and outer end of cell 1*st* M_2 seamed with brown; abdominal sternites margined anteriorly and laterally with brownish black, and with an elongate median dash of the same colour.

Female.—Length about 18 mm., of which the abdomen includes 13·6 mm. ; wing 12 mm. ; hind leg, femur 9 mm., tibia 11·4 mm.

Rostrum and palpi dark brown. Antennæ dark brown, the base of the elongate first scapal segment sparsely golden-pollinose ; second scapal segment obliquely subglobular ; three basal flagellar segments united into a stout fusion-segment, the suture between the second and third weakly indicated ; remaining flagellar segments gradually becoming longer and narrower outwardly ; verticils rather short. Anterior part of the vertex densely golden-pollinose ; between the eyes at the narrowest point a broad velvety-black band enclosing an oval golden median area ; remainder of the vertex black, sparsely golden-pollinose ; vertex with a small raised median area.

Pronotum rather conspicuous, shiny chestnut-brown. Mesonotal præscutum reddish brown with two narrow, indistinct, brown stripes, one on either side of the pale median line ; remainder of the mesonotum reddish. Pleura shiny reddish brown, darker brown on the dorsal edge of the mesepisternum and on the mesepimeron, the latter silvery-pruinose. Halteres pale brown, the knobs darker brown. Legs with the coxæ reddish brown, the fore coxæ darker ; trochanters reddish brown ; femora dull yellow, the tips narrowly dark brownish black ; tibiæ dark brown, the tips narrowly brownish black ; tarsi dark brown. Wings dull grey, the costal region more yellowish, this colour including cells *C*, *Sc*, and *2nd* R_1 ; outer end of cell R_2 more infuscated ; costal cell with a series of about ten or eleven cross-veins and spurs extending from costa, these conspicuously seamed with brown : dark brown spots at the ends of veins Sc_1, R_1, and R_2 ; paler brown seams at the origin of *Rs*, along the cord, outer end of cell *1st* M_2, and the fork of M_{1+2} : indistinct seams along veins *M* and *2nd A*, and more distinctly along *Cu* ; veins dark brown ; those in the costal region more yellowish. Venation : Sc_1 and R_1 ending rather close together at the wing-margin as in the genus ; *Rs* strongly angulated at origin and here sending a broken cross-vein to vein *M* as in *C. multistriatus* End. ; R_{2+3} shorter than the deflection of R_{1+5} ; R_2 almost perpendicular at origin, *r* inserted at the bend ; R_1 beyond *r* about equal to the basal deflection of Cu_1 ; vein R_3 bent strongly towards R_{4+5} near its tip, so cell R_2 is nearly as wide at the margin as cell *2nd* R_1 ; *r–m* nearly as long as the deflection of R_{4+5} ; cell *1st* M_2 rather small, the inner end not conspicuously produced and pointed ; cell M_1

a little shorter than its petiole; basal deflection of Cu_1 nearly at mid-length of cell *1st* M_2.

Abdominal tergites obscure yellowish, the intermediate segments with indistinct median dashes of brown; sternites very clearly marked, yellow, the lateral and basal margins brownish black; a conspicuous elongate-oval median dash that does not attain the margins. Ovipositor with the tergal valves very long and slender, slightly upcurved.

Hab. Sierra Leone.

Holotype, ♀, Kambah, March 22, 1912 (*J. J. Simpson*).

Presented by the Entomological Research Committee, 1913. 394.

Type in the collection of the British Museum (Natural History).

Clydonodozus neavei, sp. n.

Head black, sparsely brownish-pollinose; mesonotal præscutum with two narrow brown stripes; wings yellowish subhyaline with a very extensive brown pattern, the more conspicuous being a very broad band along the cord completely filling cell *1st* M_2; the costal, cubital, and anal cells are largely brown; cell *1st* M_2 long, the inner end pointed.

Sex ?—Wing 10·4 mm.

Rostrum and palpi pale. Antennæ broken. Head black, sparsely brown-pollinose; vertex broad; eyes widely separated above, narrowly beneath.

Pronotum reddish brown. Mesonotal præscutum reddish brown with two long, narrow, brown stripes, narrowly separated by a pale median line; lateral stripes broader but less clearly defined; remainder of the mesonotum dark brown, sparsely grey-pruinose, especially the postnotum. Pleura reddish brown, sparsely pruinose. Halteres pale brown, the knobs darker brown. Legs with the coxæ reddish, the outer faces of the fore and middle coxæ dark brown; trochanters reddish; remainder of the legs broken. Wings yellowish subhyaline with a very extensive brown pattern, arranged as follows: costal cell yellowish brown basally, about mid-distance between the arculus and the origin of *Rs* passing into uniform dark brown; the stigmal area is broken in the only remaining wing; a broad rounded brown spot at the arculus; another about mid-distance to the origin of *Rs*; a third at the origin of *Rs*; a very broad seam at the cord, broadened out at the fork of *M*, so that the entire cell *1st* M_2 is dark, this same area sending a seam to the fork of M_{1+2}; a broad brown seam occupies the basal half of cell *M*, passing across cell *Cu* where it occupies nearly half the length of the cell, reaching the wing-margin at the end of vein *2nd A*; large brown clouds along the wing-margin at the ends of the veins; *2nd Anal* cell brown excepting the basal third; veins dark brown. Venation: *Rs* almost square at origin; basal deflection of R_{4+5} about one-half longer than *r–m*; inner end of the long cell *1st* M_2 pointed; *r–m* and the basal deflection of Cu_1 inserted beyond mid-length of cell 1*st* M_2; petiole of cell M_1 about as long as this cell.

Abdomen reddish brown, the apex broken, so that the sex and length are uncertain.

Hab. Belgian Congo.

Holotype, sex?, Lualaba River, altitude 2500–4000 feet, November 5, 1907 (*S. A. Neave*). B.M. no. 1907. 230.

Type in the collection of the British Museum (Natural History).

Clydonodozus brevicellulus, sp. n.

Resembles *C. neavei*, but the wing-pattern is less extensive, the band along the cord narrow and not suffusing cell 1*st* M_2; mesonotal præscutum with reddish stripes; legs dark brownish black with only the femoral bases paler.

Male.—Length about 11·5 mm.; wing 11·1 mm.

Rostrum reddish brown; palpi darker brown. Antennæ with the elongate basal segment of the scape dark brown, a little paler basally; second segment dark brown; flagellum small, the verticils of moderate length; basal two or three flagellar segments united into a fusion-segment as in the genus. Head dark brown, the front and anterior part of vertex golden-pollinose.

Mesonotal præscutum reddish brown with a shiny reddish stripe on either side of the median line, these narrowed behind; remainder of the mesonotum reddish brown, sparsely pollinose. Pleura reddish brown, the mesepimeron and lateral margins of the postnotum greyish-pruinose. Halteres pale brown. Legs with the coxæ and trochanters deep reddish brown; remainder of the legs dark brown, the femora paler basally. Wings with aa strong, dull yellow tinge, the costal cell and ends of cells *2nd* R_1, R_2, and R_3 brownish yellow; pale brown clouds and seams at the origin of *Rs*; mid-distance between arculus and the origin of *Rs*; along the cord, darkest at the stigma and completely traversing the wing as a narrow seam, at cell 1*st* M_2 forking and suffusing the veins that surround this cell; a small cloud at the fork of M_{1+2}; indistinct seams along veins M and Cu; veins pale brown, those in the costal region more yellowish brown. Venation: Rs strongly arcuated at origin; cell 1*st* M_2 rather short, the inner end only moderately pointed and prolonged; basal deflection of Cu_1 beyond mid-length of cell 1*st* M_2; cell M_1 shorter than its petiole.

Abdominal tergites obscure yellowish, the ends of the eighth and ninth tergites brown; sternites yellow with a narrow, dark brown, median stripe that is but narrowly interrupted at the caudal margins of the segments; lateral margins of the sternites narrowly dark brown.

Hab. Ashanti.

Holotype, ♂, Obuasi, 1907 (*Dr. W. M. Graham*), B.M. no. 1908. 245.

Type in the collection of the British Museum (Natural History).

Clydonodozus pallidistigma, sp. n.

Male.—Length 15 mm.; wing 12·6 mm.

Generally similar to *C. brevicellulus*, differing as follows:—

Mesonotal præscutum reddish brown with three darker brown stripes, the median stripe entire; legs with the femora dark brown, the tips broadly black, especially those of the fore legs, those of the hind legs narrower; tibiæ black, the bases narrowly paler; tarsi black. Wings with the pattern narrowly streaked longitudinally, not clouded and banded as in *C. brevicellulus*; costal cell and cell 2*nd* R_1 are strongly infuscated and weakly marmorate, but cell Sc is light yellow to the apex, so the stigmal region is conspicuously pale; longitudinal veins inconspicuously seamed with brown, most distinct on Rs and R_3; veins dark brown. Venation: Rs with an interrupted cross-vein as in *C. puncticosta* and other species; Rs and R_3 in direct alignment; cell 1*st* M_2 rather long and pointed at the inner end; basal deflection of Cu_1 beyond mid-length of cell 1*st* M_2; cell M_1 a little shorter than its petiole.

Abdomen yellow with the median stripe on the sternites very distinct, dark brown, passing into black on the distal segments and scarcely interrupted at the caudal margins of the segments.

Hab. Uganda.

Holotype, ♂, Northern Buddu, altitude 3800 feet, September 16–18, 1911 (*S. A. Neave*).

Presented by the Imperial Bureau of Entomology, 1915. 57.

Type in the collection of the British Museum (Natural History).

Clydonodozus angustifasciatus, sp. n.

Mesonotal præscutum with three dark brownish-black stripes, the median stripe entire; scutal lobes dark; legs yellow, the femora and tibiæ narrowly tipped with black; wings yellowish, a narrow dark brown seam along the cord; abdominal sternites with a continuous median brownish-black stripe.

Male.—Length 15·2 mm.; wing 12·4 mm.; abdomen alone, 11·5 mm.

Female.—Length 17·5 mm.; wing 12·2 mm.

Generally similar to the other species of the genus herein described, differing as follows:—

Mesonotal præscutum with three dark brownish-black stripes, the median stripe entire or only shallowly bifid anteriorly; scutal lobes dark brown; scutellum yellowish testaceous; postnotum pale yellowish. Mesopleura largely dark coloured. Legs dull yellow, the tips of the femora and tibiæ narrowly (1 mm.) black; tarsi brownish yellow, the distal segments dark brown. Wings dull yellow, the costal region more suffused; conspicuous brown clouds at the origin of *Rs* and the tip of R_2; a narrow dark brown seam across the wing at the cord, beginning at the stigma, completely encircling cell 1*st* M_2; a brown cloud at the fork of M_{1+2}; in the allotype the base of the wing and vein *M* are likewise seamed with brown. Venation: *Rs* strongly angulated at origin, at the bend with an interrupted cross-vein to *M* as in the genotype and many other species of this genus; R_{2+3} very short, only about two-thirds the length of *r–m* or about equal to *m*; inner end of cell 1*st* M_2 prolonged and pointed; cell M_1 a little longer than its petiole; basal deflection of Cu_1 slightly or far beyond mid-length of cell 1*st* M_2, in the type and paratype being at nearly three-fourths the length. In the allotype, cell 1*st* M_2 is smaller and its inner end is not so prolonged.

Abdominal sternites with the median brownish-black band almost continuous from the base of the abdomen to the eighth sternite, scarcely (if at all) interrupted at the incisures; eighth sternite black basally, the distal half dull yellow.

Hab. Uganda.

Holotype, ♂, Mpanga Forest, Toro, altitude 4800 feet, November 13–23, 1911 (*S. A. Neave*), B.M. no. 1911. 193.

Allotopotype, ♀.

Paratopotype, ♂.

Clydonodozus angustifasciatus interruptus, subsp. n.

Male.—Length 13·2 mm.; wing 10·6 mm.; abdomen alone 10 mm.

In the general features of wing- and leg-pattern, this subspecies is very similar to typical *angustifasciatus*, differing in the following features :—

Size smaller. Median præscutal stripe split by a pale median vitta; abdomen much shorter; the median stripe on the sternites reduced to short delicate lines that are nearly their own length from the posterior margins of the segments and almost as remote from the anterior margin; anterior and lateral margins of the intermediate segments narrowly blackened, the lateral margins becoming obsolete behind at about two-thirds the length of the segments; eighth sternite shorter, black with a large, rounded, pale spot on either side, the apex black. Gonapophyses of the male hypopygium straight, parallel, the tips flattened and twisted almost as in the typical variety.

Hab. Uganda.

Holotype, ♂, South of Lake George, altitude 3200–3400 feet, October 17–19, 1911 (*S. A. Neave*).

Presented by the Imperial Bureau of Entomology, 1915. 57.

Type in the collection of the British Museum (Natural History).

Genus PSEUDOLIMNOPHILA, Alexander.

Pseudolimnophila rex, sp. n.

Size large (wing of ♂ over 13 mm.); antennæ brownish black, the first flagellar segment yellowish; legs brownish black; wings with a strong dusky tinge, the cross-veins and deflections indistinctly darker; a supernumerary crossvein in cell R_2; basal deflection of Cu_1 just beyond the fork of M.

Male.—Length 13·5 mm.; wing 13·3 mm.; hind leg, femur 11 mm., tibia 11·2 mm.

Rostrum and palpi dark brown. Antennæ with the elongate first scapal segment brown, greyish-pruinose; second segment dark brown; first flagellar segment light yellow; remaining flagellar segments dark brownish black, elongate, with long verticils. Head greyish brown, the anterior part of the vertex indistinctly yellowish with a large dark mark between the eyes at the narrowest point; occiput brighter brown.

Pronotum narrowed to meet the very long, narrow, backward prolongation of the head, light cinnamon-brown. Mesonotum light brown, the præscutum with slightly darker stripes, this part of the body discoloured in the unique type; tuberculate pits not evident. Pleura dark, the bloom discoloured. Halteres light brown, the knobs dark brown. Legs with the coxæ dark brown; trochanters reddish brown; remainder of the legs dark brown. Wings with a strong dusky tinge, the costal and subcostal cells darker; faintly darker clouds at the origin of *Rs*, along the cord and outer end of cell 1*st* M_2; veins dark brownish black. Venation: *Sc* moderately long, Sc_1 ending beyond the fork of *Rs*, Sc_2 a little removed from the tip of Sc_1; *Rs* angulated and spurred at origin; a supernumerary cross-vein in cell R_2 near mid-length; *r* on R_2, the distance between it and the fork of R_{2+3} about equal to the basal deflection of R_{4+5}; R_1 beyond *r* about one-half longer than *r*; R_{2+3} arcuated at origin, shorter than R_2 before the supernumerary cross-vein; petiole of cell M_1 about one-half as long as the cell and about equal to the deflection of R_{4+5}; cell 1*st* M_2 relatively small, closed, basal deflection of Cu_1 slightly beyond the fork of *M*.

Abdomen dark brown.

Hab. Uganda.

Holotype, ♂, Mabira Forest, Chagwe, altitude 3500–3800 feet, July 16–25, 1911 (*S. A. Neave*). B.M. no. 1913. 140.

Type in the collection of the British Museum (Natural History).

Pseudolimnophila aurantiaca, sp. n.

General coloration light orange-brown; first flagellar segment dark brown with the basal third yellow; head light grey; wings pale grey, the stigma pale brown; *Rs* longer than R_{2+3}; *r* close to the tip of R_1; cell 1*st* M_2 small; basal deflection of Cu_1 at about one-quarter the length of cell 1*st* M_2.

Male.—Length 6·2–7·5 mm.; wing 6·5–8 mm.

Rostrum pale brown; palpi dark brown. Antennæ dark brown; first flagellar segment of about the same size and form as the second, dark brown, the basal third conspicuously light yellow. Head dark, light grey-pruinose; head only moderately prolonged behind.

Mesonotum light orange-brown without stripes; postnotum paler, yellow. Pleura pale yellow. Halteres pale, the knobs brown. Legs with the coxæ and trochanters light yellow; femora pale brown, the bases paler, the tips dark brown; tibiæ and tarsi dark brown. Wings very indistinctly pale grey, only the stigma indistinctly pale brown, oval in outline; veins dark brown. Venation: agreeing most nearly with *P. frugi* in that the basal deflection of Cu_1 is far before mid-length of cell *1st* M_2; Rs longer than R_3; R_{2+3} longer and more arcuated than in *frugi*: r on R_2 immediately beyond the fork of R_{2+3}; R_1 beyond r a little longer than this cross-vein alone; cell *1st* M_2 small, shorter than the petiole of cell M_1; cell M_1 a little shorter than its petiole; basal deflection of Cu_1 at about one-quarter the length of cell *1st* M_2.

Abdomen light brown.

Hab. Southern Rhodesia.

Holotype, ♂, Mt. Chirinda, Melsetter District, altitude 3800 feet, March 4, 1910 (*C. F. M. Swynnerton*).

Paratopotype, ♂, December 6, 1911.

Presented by the Entomological Research Committee, 1912. 117. 145.

Type in the collection of the British Museum (Natural History).

Pseudolimnophila senex, sp. n.

Male.—Length 9·5 mm.; wing 10 mm.; hind leg, femur 9·1 mm., tibia 9 mm.

Related to *P. frugi* (Bergroth) of South Africa, but very much larger, differing moreover as follows:—

Pleura more plumbeous; legs entirely pale brownish yellow, the tips of the femora not darkened; wings with a strong greyish suffusion. Venation: r considerably removed from the tip of R_1, the latter being twice the length of r alone; vein R_2 running generally parallel to R_3 for its entire length so that cell *2nd* R_1 is much wider at the wing-margin than cell R_2; deflection of R_{4+5} about equal to r–m; petiole of cell M_1 unusually short, less than one-half cell M_1; cell *1st* M_2 longer than vein Cu_1 beyond it; basal deflection of Cu_1 at about one-fourth to one-fifth the length of cell *1st* M_2; pleurites of the male hypopygium long and slender.

Hab. Uganda.

Holotype, ♂, Ankole–Toro Border, East of Lake George, altitude 4500 feet, October 20–21, 1911 (*S. A. Neave*).

Presented by the Imperial Bureau of Entomology, 1915. 57.

Type in the collection of the British Museum (Natural History).

Pseudolimnophila cinctifemur, sp. n.

Head pale yellowish grey; antennæ with the first flagellar segment light yellow; mesonotal præscutum brownish yellow with an oblique lateral brown stripe; pleura silvery-grey with two narrow, brown, longitudinal stripes; legs light yellow, the femora with a very narrow, dark brown subterminal ring; wings grey, spotted with pale brown; cell M_1 small; abdomen dark brown, the sternites more yellowish.

Female.—Length about 8·5 mm.; wing 7·3 mm.

Rostrum and palpi dark brown. Antennæ with the first segment brownish yellow, sparsely pollinose; second segment yellowish brown, the tips dark brown; first flagellar segment small, subglobular, light yellow; remaining flagellar segments dark brown, the distal segments considerably elongated. Head pale yellowish grey, the occiput paler.

Pronotum conspicuous, pale brownish yellow, the anterior margin concave. Mesonotal præscutum rather bright brownish yellow, with a capillary dark brown median line; cephalic and lateral margins of the sclerite narrowly dark brown, the latter near the wing-root sending a broad brown stripe obliquely cephalad towards the dorso-median line, the two enclosing between them a humeral yellowish area of a rectangular form with the pseudosutural foveæ at about mid-length; scutum brown, the scutal lobes darker brown; scutellum and postnotum pale brownish grey, the latter with an indistinct capillary brown median line. Pleura indistinctly pale grey-pruinose with two short, longitudinal, brown lines, one on the mesepisternum, the other near the dorsal limits of the mesosternum; dorso-pleural membrane likewise darkened; a silvery-grey area on the sides of the postnotum, in front of the halteres. Mesosternum pale. Halteres light yellow. Legs with the coxæ light yellow, the extreme tips a little darker; trochanters dull yellow; femora light yellow, a short distance (0 9–1·0 mm.) before the tips with a very narrow (0·3 mm.) dark brown ring; remainder of the legs light yellow, only the distal tarsal segments dark brown. Wings grey, spotted with pale brown along the veins; in the costal cell a few darker brown spots and dots, the more conspicuous at the arculus, tip of Sc_1, and tip of R_1; the largest of the pale brown areas occur at the origin of *Rs*, at the stigma, along the cord and outer end of cell 1*st* M_2 and at the ends of the longitudinal veins; a series of small brown dots along veins *Cu* and *2nd A*; no dots along *Rs* except the large one at the origin; the general effect of the wing-pattern is of a rather abundant basal and apical clouding with a broad cross-band that is almost as wide as the length of the sector, practically destitute of dark markings, only the series along vein *Cu* being present. Venation: *Rs* angulated at origin; basal deflections of R_{4+5} and Cu_1 subequal; *r–m* shorter than *m*; cell *1st* M_2 rectangular, longer than the basal deflection of Cu_1 which is inserted at about the middle of its length; cell M_1 very small, only about two-fifths the length of its petiole.

Abdominal tergites dark brown; sternites brownish yellow. Ovipositor with the valves long and slender.

Hab. Southern Nigeria.

Holotype, ♀, Akassa, May 5, 1910 (*J. J. Simpson*).

Presented by the Entomological Research Committee, 1910. 222.

Type in the collection of the British Museum (Natural History).

Pseudolimnophila varipes, sp. n.

Male.—Length about 6 mm.; wing 7·2 mm.

Close to *P. cinctifemur*, differing as follows:—

Scapal segments dark brown, the flagellar segments pale yellow. Head pale brownish grey with a faint brown median line, paler adjoining the margin of the eyes. Pronotum with a median brown line. Mesonotal præscutum darker-coloured, but with the arrangement of the pattern generally similar. Mesosternum dark brown. Halteres with the knobs dark brown. Legs with the coxæ greyish; trochanters brownish yellow; femora brown throughout; remainder of the legs abruptly light yellow, only the terminal tarsal segments a little darker. Wing-pattern much heavier, the pale grey spots along the veins very numerous and in almost all cases large and confluent across the cells; a series of about fifteen small brown dots in the costal cell; larger and darker spots at the ends of veins Sc_1, R_1, R_2, and R_3. Venation: *Rs* shorter; R_{2+3} longer, about equal to the petiole of cell M_1; cell *1st* M_2 very small, subquadrate, the basal deflection of Cu_1 inserted just before the middle of its length; petiole of cell M_1 nearly equal to this cell. Abdominal segments dark brown.

Hab. Uganda.

Holotype, ♂, Entebbe, June 8, 1910 (*Dr. C. A. Wiggins*).

Presented by the Imperial Bureau of Entomology, 1914. 142.

Type in the collection of the British Museum (Natural History).

This beautiful *Pseudolimnophila* is even closer to *P. rhodesiæ* (Alexander) of Rhodesia than it is to *P. cinctifemur*; from the former it differs in the coloration of the mesonotum; the wing-pattern is much heavier, the spots along most of the veins being confluent with one another across the intervening cells; in the costal cell an almost regular series of about fifteen brown dots; the venational details are slightly different, especially in the length of the veins beyond cell *1st* M_2. The colour of the legs in *P. rhodesiæ* is unknown. These three species form a rather isolated group of the genus distinguished by the beautifully patterned wings and the very small cell *1st* M_2.

Tribe LIMNOPHILINI.

Genus LIMNOPHILA, Macquart.

Limnophila distigma, sp. n.

Head grey; mesonotal præscutum yellowish grey with four darker stripes; pleura with a narrow brown longitudinal stripe; mesosternum dark brown; wings pale grey, sparsely spotted with dark brown at the forks and ends of the veins; *r* at the tip of R_1; basal deflection of Cu_1 at mid-length of cell *1st* M_2.

Sex ?—Wing 8·7 mm.

Rostrum and palpi dark brown. Antennæ with the basal segment yellow; remainder of the antennæ broken. Head grey; eyes large, the vertex between them narrow.

Pronotum pale grey; prosternum distinct, separating the fore coxæ, appearing as a narrow, dark-coloured plate. Mesonotal præscutum pale yellowish grey with four darker stripes, the long intermediate pair narrowly separated by an indistinct, capillary, pale line; lateral stripes less distinct; scutum and scutellum pale yellowish grey, the lobes of the former indistinctly marked with brown; postnotum clear light grey. Pleura obscure brownish yellow with a rather narrow, interrupted, dark brown stripe extending from the propleura across the mesepisternum, ending as a rounded spot on the mesepimeron; a spot on the mesepisternum, ventrad of the stripe; mesosternum dark brown. Halteres dull yellow, the knobs brown. Legs with the coxæ pale yellow, the outer face of the fore coxæ a little darker; trochanters yellow; remainder of the legs dark brown, the femoral bases paler brown. Wings with a pale brownish-grey tinge, sparsely marked with small, rounded, brown spots, as follows: at arculus; at origin of *Rs*; at the fork of *Sc*; at the fork of R_{2+3}; tip of R_1, the two last spots forming a geminate mark at the region of the stigma; spots at the tips of veins R_2, R_3, *2nd A*, and smaller spots at the ends of all the intermediate longitudinal veins; cord and outer end of cell *1st* M_2 very narrowly seamed with brown; a rounded brown cloud at the fork of M_{1+2}; veins dark brown. Venation: *Sc* moderately long, Sc_1 ending a short distance beyond the fork of *Rs*, Sc_2 nearly at the tip of Sc_1 and exactly opposite the fork of *Rs*; *Rs* long, strongly angulated at origin; R_{2+3} long, gently arcuated, longer than cell *1st* M_2; *r* at the tip of R_1 and just before mid-length of R_2; inner ends of cells R_3, R_5, and *1st* M_2 almost in alignment; cell M_1 deep, about two and one-half times the length of its petiole; cell *1st* M_2 large, subrectangular; outer deflection of M_3 a little longer than *m*; basal deflection of Cu_1 at or just beyond mid-length of cell *1st* M_2. Macrotrichiæ on the veins numerous, black; on veins *R* and *2nd A* extending to basad of arculus.

Abdominal segments dark brown, the apices broadly yellowish, broader and more evident on the sternites. The abdomen is broken before mid-length in all three specimens available.

Hab. British Central Africa.

Holotype, sex? (*Dr. C. W. Daniels*), no. 82.

Paratopotypes, 2 specimens of uncertain sex, one carded with the type.

Type in the collection of the British Museum (Natural History).

Limnophila diffusa, sp. n.

Head grey; mesonotal præscutum yellow with three dark brown stripes; wings greyish yellow with a very pale diffuse pattern; abdominal segments ringed with brown and yellow.

Female.—Length 8·6 mm.; wing 9 mm.

Rostrum yellowish; palpi brown. Antennæ with the elongate first scapal segment pale brown, the second obscure yellow; flagellum broken. Head grey, the region of the occiput more brownish yellow.

Pronotum pale greyish brown. Mesonotal præscutum yellow with three dark brown stripes, the long median stripe broadest in front, barely attaining the suture; pseudosutural foveæ dark brown, conspicuous; no evident tuberculate pits; scutum with the lobes dark brown: median area of the scutum and the scutellum pale brownish yellow; postnotum greyish-pruinose. Pleura yellow. Halteres pale brown, the knobs broken. Legs with the coxæ and trochanters yellow; femora brownish yellow; remainder of the legs pale brown, the tips of the femora and tibiæ scarcely darkened. Wings with a greyish-yellow tinge; stigma oval, brown; very diffuse, extensive grey clouds at the origin of *Rs*, along the cord and outer end of cell 1*st* M_2; veins dark brown. Venation: *Sc* long, Sc_1 ending nearly opposite or slightly before mid-length of R_{2+3}; Sc_2 at the tip of Sc_1; *r* at the tip of R_1 and on R_2 a little before mid-length of the vein; *Rs* long, gently arcuated at origin; R_{2+3} shorter than cell 1st M_2; basal deflection of R_{4+5} and *r–m* subequal; petiole of cell M_1 a little more than one-third the length of the cell; basal deflection of Cu_1 at or beyond mid-length of cell 1*st* M_2.

Abdominal tergites dark brown, paler basally, distinctly ringed caudally with yellow to give the tergites an annulated appearance; sternites more uniformly yellowish. Ovipositor with the tergal valves long and slender, gently upcurved.

Hab. British East Africa.

Holotype, ♀, Kericho, altitude 5500 feet, November 1, 1912 (*R. B. Woosnam*). B.M. no. 1914. 2.

Paratopotypes, 2 ♀, one pinned on the same pin as the type-specimen of *Erioptera subirrorata*.

Type in the collection of the British Museum (Natural History).

Limnophila diffusa is generally similar to *L. distigma*, but is readily told by the wing-pattern and slightly different venation, especially the longer R_2 which is bent at about mid-length toward the wing-apex, so that cell 2*nd* R_1 is nearly three times as wide at the wing-margin as is cell R_2; R_{2+3} is much shorter and less arcuated.

Limnophila abyssinica, sp. n.

General coloration shiny black; legs black, the femoral bases yellow; wings yellowish, the veins heavily seamed with brown; abdomen black, the hypopygium reddish.

Male.—Length about 8 mm.; wing 8 mm.

Rostrum and palpi black. Antennæ with the scape black, the first segment very long, cylindrical; flagellum broken.

Head very broad, black, with a sparse brown pollen; vertex with numerous, mostly proclinate bristles; vertex between the small eyes very broad.

Pronotum moderately conspicuous, dark brown; scutum transversely rectangular; prosternum moderately broad, separating the fore coxæ. Mesonotum shiny black throughout. Pleura similar with a sparse brownish pollen. Halteres brown, the base of the stem paler brown, the knobs dark brownish black. Legs with the coxæ very large, black; trochanters reddish brown; legs black, the bases of the femora rather bright yellow, this narrowest on the fore legs where it occupies a little more than the basal quarter, broadest on the hind legs where about a third of the femur is included; femora rather stout. Wings yellowish subhyaline with a rather heavy brown pattern, distributed as follows: at *h*; in the basal cells extending from *C* to vein *1st A*, lying a short distance beyond the arculus; an interrupted cross-band at the level of the origin of *Rs*, consisting of a large rounded spot at the latter position and a still larger, hour-glass shaped mark extending from cell *M* to the wing-margin at the end of vein *2nd A*, narrowest at vein *1st A*, this band interrupted on both sides of vein *M* in cells *R* and *M*; the third area consists of a similarly interrupted band at the cord, broadest at the costal margin, narrowed behind to the fork of *M*, continued behind this as a broad seam on the basal deflection of Cu_1, which forks, sending a branch to both *1st A* and Cu_2 at the wing-margin; outer end of cell *1st* M_2 seamed with brown; a small spot at the fork of M_{1+2}; conspicuous rounded brown clouds at the ends of all the longitudinal veins, those at the wing-tip being confluent across cells R_2 to M_1; a large rounded spot at the middle of cell *2nd A*; veins yellow, dark brown in the darkened areas. Venation: *Sc* ending immediately before the fork of *Rs*, Sc_2 at the tip of Sc_1; *Rs* long, straight, forming an acute angle at its origin; R_{2+3} short, about equal to *r–m*; *r* near the tip of R_1 and at about mid-length of the long R_2; basal deflection of R_{4+5} about one-half longer than *r–m*; inner ends of cells R_3 and R_5 almost in alignment or the latter a little more distad; cell *1st* M_2 rectangular, the basal deflection of Cu_1 at about three-fifths its length; cell *1st* M_2 a little longer than its petiole; forks of vein *Cu* about equal; *2nd Anal* vein sinuous.

Abdomen shiny black, the ninth pleurites and appendages conspicuously reddish; pleural appendages slender, gently curved, decussate.

Hab. Abyssinia.

Holotype, ♂, Higo Samula, October 30, 1911 (*R. J. Stordy*). B.M. no. 1912. 329.

Type in the collection of the British Museum (Natural History).

Limnophila unijuga, sp. n.

Head light grey; mesonotum light brownish yellow; a capillary dark brown dorso-median line extending from the head to the base of the abdomen; femora dark brown with an indistinct yellowish ring before the tips; wings light yellow with a narrow, dark brown cross-band at the cord and small brown spots at the ends of all the veins; R_{2+3} short, cell M_1 present.

Male.—Length 9 mm.; wing 10 mm.; hind leg, femur 7·2 mm., tibia 8 mm.

Female.—Length 11·5 mm.; wing 11·4 mm.

Rostrum and palpi dark brown. Antennæ with the first segment elongate, black; second scapal and first five flagellar segments bicolorous, the basal half dull yellow, the apical half dark brown; distal flagellar segments elongate, dark brown; basal flagellar segments narrowed basally, more enlarged distally. Head light grey with a conspicuous, capillary, black median line that is split and enlarged at its anterior end between the eyes; remainder of the vertex with scattered dark brown setigerous punctures; head somewhat narrowed behind, but not so accentuated as in *Pseudolimnophila*.

Pronotum light fawn-coloured, dark brown medially; prosternum between the large fore coxæ narrow. Mesonotal præscutum light brownish yellow with a capillary dark brown median line; tuberculate pits retreated rather far back to beyond mid-length of the distance to the pseudosutural foveæ, one on either side of the capillary median line above described; remainder of the mesonotum pale greyish yellow, the median line becoming much broader and darkening into black. Pleura dull yellow, the mesopleura indistinctly greyish-pruinose. Halteres dull yellow, the knobs dark brown. Legs with the coxæ and trochanters dull yellowish; femora dark brown, the bases narrowly paler; an indistinct obscure yellowish ring before the nearly subequal dark brown tips; tibiæ and tarsi dark brown. Wings with a strong yellowish tinge, sparsely marked with dark brown spots and seams, the most conspicuous being a dark seam along the cord; these marks are as follows: at the origin of *Rs*; a narrow brown seam along the cord and outer end of cell 1*st* M_2, in the female the former band continues entirely across the wing; small brown dots at the ends of all the longitudinal veins, at *r*, at the fork of M_{1+2}, and at two-thirds the length of vein *1st A*; veins pale brown, darker in the brown areas. Venation: *Sc* ending about opposite the fork of *Rs*, Sc_2 at the tip of Sc_1; *Rs* moderately elongated, the base with a short angulation; R_{2+3} very short, about equal to *r* or a little longer; *r* at the tip of R_1, a little before mid-length of R_2; inner ends of cells R_3, R_5, and *1st* M_2 in alignment; cell *1st* M_2 short and almost square in the allotype, more rectangular in the type, the basal deflection of Cu_1 at about mid-length; cell M_1 a little longer (male) or shorter (female) than its petiole.

Abdomen dull yellow, the outer tergites indistinctly darker caudally; pleurites of the hypopygium not greatly elongated. Terminal segments of the abdomen in the female abruptly smaller than the others, subtelescopic; valves of the ovipositor slender, the tergal valves a little upcurved at their tips.

Hab. British East Africa, Nyasaland.

Holotype, ♂, North slope of Kenya on the Embu–Meru Road, British East Africa, altitude 4500–5000 feet, February 13–14, 1911 (*S. A. Neave*). B.M. no. 1912. 70.

Allotype, ♀, Mt. Mlanje, Nyasaland, altitude 6500 feet, November 11, 1913 (*S. A. Neave*). B.M. no. 1914. 498.

Type in the collection of the British Museum (Natural History).

Limnophila difficilis, sp. n.

Antennæ elongate; head light grey; general coloration yellow, the mesonotal præscutum and scutum marked with dark brown; wings subhyaline, stigma indistinct; Sc_1 long, *r* some distance from the tip of R_1, cell M_1 lacking, cell *1st* M_2 open by the atrophy of the outer deflection of M_3.

Female.—Length about 6·5 mm.; wing 7·6 mm.

Rostrum and palpi pale brown. Antennæ moderately elongated, the scapal segments obscure yellow, the flagellum pale brown; the apical segments of the flagellum are broken so that it is impossible to tell the exact length of the organ, but from the unusually elongate structure of the flagellar segments it is evident that the antennæ are of a distinctly elongate type; verticils numerous, scattered along the segment, the longest about equal to the segments that bear them. Head light grey with yellowish setæ.

Pronotum conspicuous, pale yellow. Mesonotal præscutum obscure yellow with four dark brown stripes, the intermediate pair ending before the suture, very narrowly and indistinctly separated from one another by a pale capillary line; pseudosutural foveæ large, pale; no tuberculate pits; scutum obscure yellowish, each lobe with two confluent dark brown spots, the more lateral being continuations of the lateral præscutal stripes; scutellum and postnotum yellow. Pleura pale yellow. Halteres with the stem yellow, brightest basally, the knobs dark brown. Legs with the coxæ and trochanters yellow; remainder of the legs broken. Wings pale greyish subhyaline, the stigma very indistinct and ill-defined; veins dark brown. Venation: Sc_1 ending opposite the fork of Rs; Sc_2 some distance from the tip of Sc_1, the latter vein alone being a little longer than R_{2+3}; Rs rather long, gently arcuated; R_{2+3} almost in alignment with Rs, rather short, a little longer than the deflection of R_{4+5}; r on R_2 about, or less than, its own length beyond the fork of R_{2+3}; R_1 beyond r, about equal to Sc_1 alone; basal deflection of R_{4-5} and r–m in oblique alignment; cell M_1 lacking; cell *1st* M_2 open by the atrophy of the outer deflection of M_3; cell *2nd* M_2 a little more than twice its petiole; basal deflection of Cu_1 beyond the fork of M, the fusion of Cu_1 and M_3 being about two-thirds the length of the basal deflection of Cu_1.

Abdomen light reddish brown; tips of the terebra broken in the unique type.

Hab. Nyasaland.

Holotype, ♀, Blantyre, 1914 (*Dr. J. B. Davey*).

Presented by the Imperial Bureau of Entomology, 1915. 128.

Type in the collection of the British Museum (Natural History).

The legs are lacking in the unique type, and it becomes a rather difficult matter to place this fly generically. However, there seems no doubt in my mind but that the above reference is the correct one.

Limnophila malagasya, sp. n.

Antennæ small, the flagellum yellowish; general coloration dark brown; halteres yellow; legs yellow, the tips of the femora broadly, of the tibiæ narrowly, dark brown; legs with an abundant outspreading pubescence; wings whitish subhyaline with a heavy brown pattern that is irregularly cross-banded, darkest in the costal cells, paler in the caudal cells; interspaces without dark markings.

Female.—Length 19 mm.; wing 18 mm.

Rostrum and palpi dark brown. Antennæ short; scapal segments dark brown; flagellar segments small and thin, pale brownish yellow; verticils long. Head dark brown.

Pronotum and mesonotum dark brown, the præscutum with four narrow, dark brown stripes, the intermediate pair separated from one another by a pale grey line. Pleura dark brown, discoloured in the unique type. Halteres light yellow, the knobs scarcely darker. Legs with the coxæ obscure yellow, the bases indistinctly infuscated, especially the fore and middle coxæ; trochanters pale brownish yellow; femora yellow, the tips broadly dark brown; tibiæ similar, the tips narrowly dark brown; first two tarsal segments yellow, the tips very narrowly brown; remaining tarsal segments brown; legs moderately long and stout, the segments clothed with an abundant, delicate, nearly erect pubescence. Wings whitish subhyaline with a heavy brown pattern, the wing-base indistinctly yellowish; the dark markings are arranged as follows: a series of about twelve to fifteen spots and blotches in the costal and subcostal cells; the major wing-pattern appears as about four ill-defined cross-bands, those before the cord paler and confluent in cells *Cu* and *1st A*; the band at the cord is broadest and darker brown, extending from before the end of Sc_1 to beyond the end of R_1, including the bases of cells R_2 and R_3; in the vicinity of cell *1st* M_2 the band is pale brown with nearly hyaline areas near the veins; this third band completely traverses the wing, ending at the tips of veins Cu_2 and *1st A* as very pale blotches; this band is connected in cell *M* with the paler second band which occupies the level of the origin of *Rs*; the fourth band occupies the wing-apex, appearing as two dark areas at the ends of veins R_2 and R_3, paler in the other cells, including about the outer half of cells R_3 and R_5, all of M_1, the outer three-quarters of *2nd* M_2 and the tips of M_3 and Cu_1; a white spot near the end of cell R_2 separating the brown blotches at the ends of veins R_2 and R_3; series of a few pale brown spots along the wing-margin in cells *1st A* and *2nd A*, along the anal veins on their outer ends and near the base of cell *Cu*; the white interspaces are free from brown dots; veins dull yellow, brown in the darkened areas. Venation: *Sc* long, Sc_1 ending about opposite mid-length of R_{2+3}, Sc_2 at the tip of Sc_1; *Rs* long; R_{2+3} rather shorter than cell *1st* M_2; *r* on R_1 about twice its length before the tip, and on R_2 about twice its length beyond the fork of R_{2+3}; inner ends of cells R_3, R_5, and *1st* M_2 almost in alignment; cell M_1 deep, nearly twice as long as its petiole;

cell 1*st* M_2 moderately small, *m* less than one-half the outer deflection of M_3; basal deflection of Cu_1 at from two-thirds to three-quarters the length of cell 1*st* M_2; 2*nd Anal* vein sinuous.

Abdomen dark brown. Ovipositor with the valves long and slender, the tergal valves gently upcurved before the acute tips; sternal valves straight and very slender, acicular.

Hab. Madagascar.

Holotype, ♀, collected by M. D. Cowan. B.M. no. 80. 45.

Type in the collection of the British Museum (Natural History).

Tribe HEXATOMINI.

Genus ERIOCERA, Macquart.

Eriocera leonensis, sp. n.

Antennæ short in both sexes; head orange; mesonotum brown, the præscutum with broad, shiny black stripes; legs black, the bases of the femora obscure yellowish; wings dark brownish black, cell M_1 lacking; abdomen dark brown, the basal two segments orange.

Male.—Length about 12·5 mm.; wing 13·6 mm.

Mouth-parts very small, dark brown. Antennæ short in both sexes, dark brown, the segments with numerous, long, scattered verticils. Head orange-red; vertical tubercle low, distinctly bifid by a shallow V-shaped notch.

Mesonotum light brown, the præscutum with three broad, shiny black stripes that almost obliterate the ground-colour; scutum light brown, the lateral and anterior parts of the lobes black; scutellum and postnotum light brownish yellow. Pleura dark brownish black; sides of the mesosternum paler. Halteres black, the extreme base paler. Legs with the coxæ black, the outer faces of the middle and hind coxæ marked with brown; trochanters dark brown, the inner faces obscure yellow; remainder of the legs black, only the basal fourth of the fore femora obscure yellow; middle and hind legs broken. Wings with a strong, almost uniform, brownish-black suffusion, a little paler in the caudal cells; veins dark brown. Venation: *Sc* ending just beyond the fork of *Rs*, Sc_2 a little removed from the tip of Sc_1, the latter vein alone about equal to *r–m*; *r* some distance from the tip of R_1, this tip about equal to R_{2+3}; r on R_2 about, or a little more than, its own length beyond the fork of R_{2+3}; inner end of cell 1*st* M_2 broader than the outer end, the basal deflection of M_{1+2} long, indistinctly spurred; cell 1*st* M_2 about equal to vein M_3 beyond it; cell M_1 lacking; basal deflection of Cu_1 at the fork of M or some distance beyond (one-third the length of cell 1*st* M_2 in cases); forks of Cu very divergent, almost forming a straight angle, Cu_2 a very little shorter than the deflection of Cu_1. Of the type-specimen but a single wing remains, but of the paratype both wings are preserved.

Abdomen with the basal two segments orange, the remaining segments passing into dark brown.

Hab. Sierra Leone.

Holotype, ♂, Baiima, August 10, 1912 (*J. J. Simpson*).

Paratype, sex?, Makump, September 19, 1912 (*J. J. Simpson*).

Presented by the Entomological Research Committee, 1913. 394.

Type in the collection of the British Museum (Natural History).

Eriocera leonensis is closely related to *E. obscura* (Bigot) of Madagascar, but the details of coloration are different.

Eriocera pusilla, sp. n.

Size very small (length under 6 mm.); general coloration dark brownish black; antennæ of the male greatly elongated; vertex of the male with a conspicuous globular crest; wings with cell R_2 small, cell M_1 lacking, cell 1*st* M_2 closed; ovipositor with fleshy valves.

Male.—Length 5·4 mm.; wing about 7 mm.

Female.—Length 5 mm.; wing about 5·7–6 mm.

Rostrum and palpi dark brown. Antennæ of the male greatly elongated; when entire probably at least twice the length of the body; in the unique male, there are but three flagellar segments remaining; the first scapal segment is pale brown, obscure yellowish beneath; second segment very small, dark brownish black; first flagellar segment with a dense, pale, erect pubescence and a single spine near three-fourths the length; second flagellar segment with widely separated spines arranged in two rows, the more distal of these more or less definitely in pairs; antennæ of female short. Head dark brownish black, the vertex of the male immediately behind the antennal bases with a very large globular crest.

Thorax dark brownish black throughout; in the female, the scutellum grey-pruinose. Halteres dark brown. Legs with the coxæ and trochanters brownish black; remainder of the legs dark brown. Wings subhyaline; stigma brown; veins dark brown. Venation: Rs long, gently arcuated; R_{2+3} long, almost straight; r on R_{2+3} a variable distance before the fork, from about one-half to about twice its own length; cell R_2 small; cell M_1 lacking; cell 1*st* M_2 closed; basal deflection of Cu_1 at, or a short distance beyond, the fork of M.

Abdomen dark brownish black. Ovipositor with the valves blunt and fleshy as in *E. longicornis* Walker (eastern North America).

Hab. Northern Nigeria, Nyasaland.

Holotype, ♂, Zungeru, N. Nigeria, November 1910 (*Dr. J. W. Scott-Macfie*). B.M. no. 1911. 417.

Allotopotype, ♀, October 27, 1910. B.M. no. 1912. 119.

Paratype, ♀, Mlanje, Nyasaland, April 5, 1913 (*S. A. Neave*). B.M. no. 1913. 140.

Type in the collection of the British Museum (Natural History).

Eriocera pusilla is the smallest species of the genus known to the writer. No decisive differences are apparent between the specimens from Nigeria and that from Nyasaland.

Eriocera nyasicola, sp. n.

Antennæ of the male elongated; head obscure reddish; general coloration shiny black; legs black; wings pale brown, the costal margin dark brown; veins seamed with brown, cell M_1 lacking.

Male.—Length about 11 mm.; wing 13·6 mm.; antenna about 33 mm.

Female.—Length 15·8 mm.; wing 14·4 mm.

Rostrum and palpi dark brown, the basal segments of the latter lighter-coloured in the female. Antennæ of the male very long, approximately three times the length of the body, the third flagellar segment (8·5 mm.) equal to the combined thorax and abdomen; antennæ with the scapal segments deep wine-brown; flagellum black, the flagellar segments provided with rows of slender bristle-like spines that become even more slender, hair-like, on the last segment; these spines are approximately equidistant from one another on all the segments; flagellar segments increasing in length from the first to the fourth; in the female, the scapal segments are orange; flagellum broken. Head orange, darker in the male; both sexes are provided with a large globular crest, larger and more erect in the male, more proclinate but entire in the female.

Thorax deep shiny black, very sparsely brownish-pollinose. Pleura similar, sparsely pruinose. Halteres black, the base of the stem paler. Legs with the coxæ black, sparsely grey-pruinose; trochanters brownish black; remainder of the legs black. Wings with a pale brownish tinge, the costal and subcostal cells dark brown; stigma rather small, dark brown; all the veins conspicuously seamed with brown; veins dark brown. Venation: r on R_2 about its own length or a little less beyond the fork of R_{2+3}; inner ends of cells R_5 and 1*st* M_2 in alignment; a spur at the bend of the basal deflection of M_{1+2}; cell M_1 lacking; cell 1*st* M_2 small, a little shorter than Cu_1 beyond it.

Abdomen shiny black, the basal segments brownish black. Genital segment and ovipositor horn-coloured, the valves of the latter elongate, the tergal valves slightly upcurved, acute.

Hab. Nyasaland.

Holotype, ♂, Mlanje, January 28, 1913 (*S. A. Neave*).

Allotopotype, ♀,, January, February 1914 (*Dr. J. B. Davey*).

Paratopotype, ♂, with the type.

Presented by the Entomological Research Committee, 1913. 236.

Type in the collection of the British Museum (Natural History).

Eriocera tumidiscapa, sp. n.

Antennæ of the male exceedingly elongate; general coloration grey, the mesonotal præscutum with four brown stripes; femora yellowish, narrowly tipped with brown; wings subhyaline, the costal cell pale brown, cell M_1 lacking.

Male.—Length 10–12·4 mm.; wing 14–15·8 mm.; antenna 50–52 mm.

Generally similar to *E. nyasicola*, differing as follows:—

Larger; antennæ longer, in the male more than four times the length of the body; basal segment of the scape more tumid; vertical crest of the male still larger and more globose. General coloration of the thorax grey, the præscutum with four brown stripes ; thorax with a dense, erect, pale pubescence. Pleura dull grey. Legs with the femora dull yellow, the tips brown ; tibiæ yellowish brown, the tips narrowly darker brown ; tarsi dark brown. Wings paler than in *E. nyasicola*, the costal cell much paler brown ; veins not, or indistinctly, seamed with brown. Abdomen yellowish brown, the segments narrowly margined with black. Male hypopygium small ; pleurites slender, curved ; appendages small.

Hab. Sierra Leone, Nyasaland.

Holotype, ♂, Sierra Leone (*W. G. Clements*). B.M. no. 93. 20.

Paratype, ♂, Mlanje, Nyasaland, January 2, 1913 (*S. A. Neave*).

Presented by the Entomological Research Committee, 1913. 236.

Type in the collection of the British Museum (Natural History).

XL.—*Notes on Myriapoda.*—XXIV. *Preliminary Note on a Millipede new to Science.* By the Rev. S. GRAHAM BRADE-BIRKS, M.Sc. (Manchester), Lecturer in Zoology and Geology, S.E. Agricultural College, Wye, Kent.

MR. H. C. CHAPELOW, Lecturer in Horticulture at Wye College, recently drew my attention to a plot of selected white czar runner-beans on Wye Field infested with millipedes.

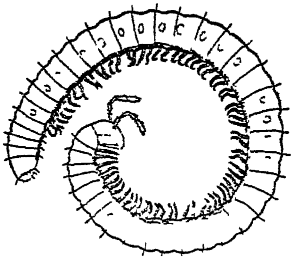
Among the species present I took a pale form, which I have submitted to Monsieur Henry W. Brölemann, and he has been kind enough to assure me that my animal is new to science and to give me some account of its systematic position.

In the light of this information I submit the following brief preliminary description :—

Proteroiulus pallidus, sp. n.

Nearly allied to *Amsteinia fusca* (Am Stein), and in general appearance similar to *Typhloblaniulus guttulatus* (Bosc).

Length about 13 mm. Ocelli absent. Body creamy white (*i. e.* without general pigment), but marked on either side with a row of yellow to reddish-brown spots which are lacking on the five front body-segments. The body is sparsely furnished with relatively long hairs.



Types in the Brade-Birks collection.

In the field the most noticeable difference between *T. guttulatus* and the new species is the paleness of the latter. In *T. guttulatus* the dark spots which run down either side of the body are very conspicuous, whereas the corresponding rows of yellow to reddish-brown spots seen in *P. pallidus* are hardly visible to the naked eye.

S.E. Agricultural College,
Wye, Kent,
21st July, 1920.

XLI.—*Scent-organs (?) in Female Midges of the* Palpomyia *Group.* By F. W. Edwards.

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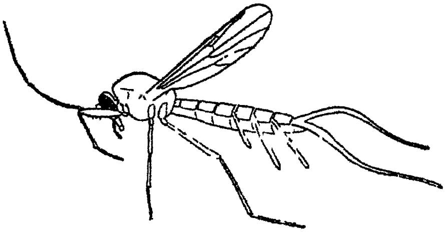
During the first half of June of this year, while staying near Dartmouth, I noticed on several successive evenings a swarm of flies which I at first took to be the males of a rather large *Chironomus*, such as *C. dorsalis*, Mg. On netting specimens, however, I was astonished to find, first that the insects were only about half as large as they appeared to be when on the wing, and secondly that the swarm consisted exclusively of *females* of *Palpomyia brachialis*, Hal. The fact that only females were present seemed sufficiently remarkable, for, as is well known, these dancing swarms of Chironomidæ and other Diptera nearly always consist of males only, and are often an essential preliminary to copulation, the females flying into the swarm one by one, pairing, and the pairs dropping out. There was, however, something still more remarkable about these insects.

By accident I squeezed one of the flies between my fingers, and noticed that some curious reddish tubes were being everted from the end of the abdomen. Subsequent examination of other specimens confirmed the presence of these tubes, and by careful observation of the insects on the wing it was ascertained that the tubes were always fully everted during flight, the position in which they were held being made out with some accuracy. When the specimens were taken in the net the tubes were withdrawn into the body with amazing rapidity, so that by the time the flies could be examined there was rarely a trace of the tubes visible externally. This, then, was the explanation of the apparent discrepancy in size between the flying and the captured insects.



Palpomyia brachialis, Hal. Flying attitude.

The accompanying diagram shows the arrangement of the fully extended tubes while the insect is in flight. The tubes arise from openings in the membrane at the bases of some of the abdominal segments. There is a pair at the bases of each of segments 5–7, each tube being nearly as long as three abdominal segments, while between segments 7 and 8 there is another pair which is as long as the whole abdomen, each tube being forked near its base, so that there are apparently four long tubes on this segment. The reddish-orange colour of the tubes is in striking contrast to the shining black body of the insect (*P. brachialis* is a species much resembling the common *P. flavipes*, Mg., but with a yellow base to the abdomen, and smoky wings yellow at the base).

Examples preserved in spirit were submitted to Dr. H. Eltringham for his opinion as to the nature of the tubes. Although these were unfortunately not fit for thorough microscopic examination, Dr. Eltringham was able to ascertain that the tubes were of a glandular nature and provided with delicate retractor muscles at different parts of their length; he expressed the opinion that they were most probably scent-producing glands. It is probable that they are connected with pairing, and serve to attract the males—though I did not observe any males fly into the swarm, and searched in vain for them by sweeping in the vicinity.

After making the above described discovery I examined every species of this group of flies which I came across, and found that the tubes were by no means confined to *P. brachialis*; on the contrary, it seems likely that they will be found, when searched for, in all species of *Palpomyia* and *Bezzia* and allied genera. Already the evidence available shows that they exist in seven species, with interesting specific modifications. *Palpomyia flavipes*, Mg., and *P. præusta*, Lw., show a pair of simple (not forked) tubes between segments 7 and 8, which, like those of *P. brachialis*, are as long as the whole abdomen; these species also have three, or perhaps four, pairs of very short blunt-ended tubes, each hardly longer than one abdominal segment, between tergites 4–7 or 3–7. In *P. flavipes* the tubes have a similar reddish-orange colour to those of *P. brachialis*, but in *P. præusta* they are for the most part pale in colour.

Another (undetermined) species of *Palpomyia* also shows tubes, the precise form of which was not properly made out.

A slightly different arrangement is seen in *P. distincta*, Hal., in which species the four pairs of tubes are all of about equal length (about as long as three segments) and quite colourless.

In the genus *Bezzia* I have so far had an opportunity of examining two species. *B. annulipes*, Mg. (? *solstitialis*, Winn.), has three pairs of colourless tubes, the pair between the seventh and eighth tergites being nearly as long as the abdomen, the other two pairs (between the fifth and sixth and sixth and seventh tergites) a little over half as long. In *B. ornata*, Mg., there is apparently only one pair of tubes, between the seventh and eighth tergites; these are colourless and not much shorter than the abdomen.

The presence of the tubes was ascertained or confirmed in all the above cases by pressing the thorax and base of the abdomen of the flies between finger and thumb. A similar test applied to various species of the genera *Forcipomyia*, *Dasyhelea*, *Kempia*, *Culicoides*, and *Stilobezzia* failed to produce any eversion, so that it is likely that the tubes occur only in the bare-winged group. Up to the present I have found them in females only; they are absent in the male of *B. annulipes*, the only species in which I have so far been able to search for them in the male sex.

Apart from *P. brachialis*, the only species in which I have observed the females swarming is *P. flavipes*, Mg. This was at Snailbeach, Salop, in July last, where a few females were observed swarming with male mayflies of the genus *Baëtis*, on which the *Palpomyia* were preying (see Ent. Month. Mag., Sept. 1920). Although the suggestion may seem fanciful, it is perhaps within the bounds of possibility that in this case the tubes were of advantage on account of their slight resemblance to the tails of the mayflies, thus rendering them more easy of capture. The possibility of this is somewhat increased by the fact that in this species I have also observed the males swarming in the normal manner. Whether the more elaborate tubes of *P. brachialis* have been developed through the addition of some sexual function, or whether (more probably, perhaps) the function is connected with sex in all cases, can only be determined by careful observation of the habits of allied species.

So far as I am aware, eversible tubes have not hitherto been found in any Chironomid, nor in the female of any insect. They are, of course, well-known in the males of some Lepidoptera and Trichoptera, and M. Tonnoir has recently described them in certain species of moth-flies of the genus *Pericoma*. In none of these cases are the tubes situated at the end of the abdomen as they are in *Palpomyia* and *Bezzia*.

XLII.—*On new Species of* Curculionidæ *from Africa.* By Guy A. K. Marshall, D.Sc., C.M.G.

[Plate XIII.]

The types of all the species described below will be deposited in the British Museum.

The terminology used in describing the male genitalia is that proposed by Dr. David Sharp, F.R.S. (Trans. Ent. Soc. Lond. 1918, pp. 209–222).

Subfamily *Brachyderinæ*.

Iphisomus swynnertoni, sp. n.

♂. Black, with the following markings formed of cream-coloured scales: a narrow median stripe on the prothorax; a broad stripe on each elytron approximately between striæ 2 and 5 from the base to beyond the middle, and a lateral one from behind the shoulder to the middle of the side-margin. Legs red-brown, with all the tarsi and the apices of the front femora and tibiæ black.

♀. Black, fairly densely and uniformly clothed with grey or sandy scaling, having a greenish or coppery reflection; the male pattern often faintly indicated, owing to the scaling being thinner from the base to the middle along the suture and between striæ 5 and 6; sometimes coloured like the ♂.

♂ ♀. *Head* closely and coarsely punctate, the scaling much more sparse in the ♂ than in the ♀; the forehead flat, with the punctures longitudinally confluent and with a central stria which is continuous with, but much narrower and shallower than, the furrow on the rostrum; the eyes rather strongly convex, the space between them much greater than the length of an eye (5 : 3). *Rostrum* much longer than the head, parallel-sided from the base to beyond the middle, gently dilated at the apex, with a broad deep median furrow and two carinæ on each side of it; the impressed spaces adjoining the carinæ longitudinally striolate, and a shallow lateral impression in front of the eye. *Antennæ* with the scape only slightly exceeding the anterior margin of the eye; the funicle with joint 1 half as long again as 2, joints 3–7 subequal and slightly transverse. *Prothorax* a little broader than long, the sides moderately and regularly rounded (rather more strongly in the ♂), not constricted near the base; the basal margin distinctly carinate and broader than the apex; the upper surface closely set with low shiny granules, without any median furrow, rather flattened on the disk, the dorsal outline being almost level; the scaling much denser in the ♀ than in the ♂. *Elytra* elliptical in ♂, broader in ♀ and more sharply acuminate behind, the basal margin truncate and strongly carinate, the basal angles not projecting forwards, the apices separately pointed; the shallow striæ with very shallow separated punctures, which are almost concealed on the apical half when the scaling is dense; the intervals almost flat, finely rugulose, with a low humeral prominence at the basal junction of intervals 7–9 in the ♀, evanescent in the ♂; the short subrecumbent scale-like setæ irregularly placed, very dense where scaling is present and much more sparse on the bare areas. *Legs* with the front femora only slightly thicker than the others in both sexes; all the tibiæ denticulate on the inner edge, the front pair with the outer edge not curved at the apex in the ♂.

Length 9–12 mm., breadth 3·5–5 5 mm.

S. Rhodesia: outskirts of Chirinda Forest, 4000 ft., Melsetter district, 1906 (*C. F. M. Swynnerton*).

Described from twenty-eight specimens.

Differs from all the previously described species in having no median thoracic furrow, and in the numerous irregular setæ on the elytra.

Iphisomus manicanus, sp. n. (Pl. XIII. fig. 6.)

♂ ♀. Very closely allied to *I. swynnertoni*, sp. n., and differing from it only in the following points:—

The prothorax with a rounded spot of pale scales on each side near the apical margin; the legs much darker in colour, the front tibiæ being entirely black. *Head* with the eyes more convex, the forehead less striolate and without any median stria. *Rostrum* much longer in proportion, especially in the ♂, the median furrow narrower and shallower. *Antennæ* with the scape appreciably longer, but joint 2 of the funicle shorter (about half as long as joint 1, instead of two-thirds), and the club more sharply acuminate. *Prothorax* with the sides much more strongly rounded, especially in the ♂, the dorsal outline sloping forwards.

Length 11 mm., breadth 4 mm.

Portuguese E. Africa: 1 ♂, 1 ♀, Amatonga's, Manika,

ii. 1906 (type); 2 ♂♂, 1 ♀, Valley of Kola R., 1500–2000 ft., E. of Mt. Chiperone, iv. 1913 (*Dr. S. A. Neave*).

In all Dr. Neave's specimens there is an additional large pale patch on the apical declivity of each elytron (var. *exclamationis*, nov.).

Protostrophus mucronatus, sp. n.

♂ ♀. Colour piceous, with dense sandy and ash-grey scaling, more or less mottled with dark brown; sometimes the paler scales and occasionally all of them are coppery brown: the prothorax with a sharply defined, broad, dark brown lateral stripe which is invisible from above and is continued on to the inflexed margins of the elytra as a more or less indefinite stripe.

Head separated from the rostrum by a short, slightly curved, transverse stria; the forehead gently convex transversely, with a very short median stria uniting with the transverse one and hardly extending to the centre of the forehead, and set with obliquely raised spatulate setæ, the shallow confluent punctation being entirely hidden by dense circular scaling; the scales on the gular region sparse and narrow; the eyes moderately prominent, deepest slightly behind the middle, the orbit narrow and not projecting on the posterior edge. *Rostrum* a little shorter than its basal width, the sides slightly sinuate; the dorsum plane, with a shallow median impression containing a mere trace of a carina; the scales on the mandibles elongate; the genæ broadly impressed. *Antennæ* setose and not squamose; the scape slender and abruptly clavate; the funicle with joint 1 nearly twice as long as 2, the remainder bead-like and transverse, 7 the broadest. *Prothorax* moderately transverse (4 : 3), broadest in the middle, the sides strongly and evenly rounded, not emarginate behind the eyes; the apical margin gently convex dorsally, oblique at the sides; the base as broad as the apex, slightly rounded and scarcely marginate; the very shallow confluent punctation entirely hidden by the scaling, with a very narrow bare median line; the upper surface strongly convex transversely and set with short suberect spatulate setæ. *Elytra* comparatively narrow, subelliptical, broadest about the middle, the base deeply sinuate; the striæ shallow, the punctures in them only faintly indicated through the scaling and each containing a minute white seta, the intervals slightly convex and each bearing a row of erect spatulate setæ; the scales very closely contiguous, subcircular and larger than those on the pronotum. *Legs* rather stout; all the tibiæ finely denticulate internally and with a well-marked apical mucro, that on the middle pair being longer than the others; the hind corbels bare, narrowly enclosed, the upper edge distinctly angulate at its base. *Sternum* with the front coxæ very close to the gular margin.

The ♂ narrower than the ♀, the prothorax slightly less transverse, the legs (especially the femora) distinctly stouter, and the last ventral segment more broadly rounded behind, and with a small median impression at the apex.

Length 3–4 mm., breadth 1·25–2 mm.

S. RHODESIA: Salisbury (*G. A. K. M.*).

Described from 15 ♂♂ and 8 ♀♀.

Closely allied to *P.* (*Strophosomus*) *setifer*, Fhs., in which the prothorax is much less strongly rounded at the sides, the base and apex are truncate, and the lateral stripe is grey and not dark brown, while the legs are more slender.

Protostrophus terrenus, sp. n.

♂ ♀. Colour black, densely clothed with contiguous subcircular scales, which are usually sandy-brown, with indistinct mottling of darker brown, especially towards the sides and apex of the elytra; the pronotum with two very faint darker stripes and a more distinct one on the side of the prosternum. Sometimes the upper surface is almost uniformly grey.

Head separated from the rostrum by a very deep bisinuate furrow; the forehead almost flat, with a broad and deep median furrow extending to behind the eyes, and set with subrecumbent flattened setæ; the eyes very prominent and strongly produced backwards, deepest distinctly behind the middle, the orbits fairly broad and very slightly projecting on the posterior edge; the gular area densely clothed with broad scales. *Rostrum* evidently shorter than its basal width, the sides straight and quite vertical, the upper surface entirely flat, except for an indistinct scale-covered median costa; the mandibles sparsely covered with small round scales; the genæ only shallowly impressed. *Antennæ* setose; the scape slender and abruptly clavate; the funicle with joint 1 half as long again as 2, the remainder about as long as broad. *Prothorax* much broader than long (5 : 3), broadest a little behind the middle; the sides strongly rounded, emarginate behind the eyes and constricted at the base; the apical margin gently arcuate dorsally and very oblique at the sides; the basal margin not broader than the apical, very slightly arcuate, almost truncate, with a deeply impressed transverse line close to the edge; the dorsum strongly convex transversely and slightly so longitudinally, the apex being lower than the base; the coriaceous sculpturing hidden by the scaling, except along a slightly raised median line, which extends from the basal stria to a little distance behind the apex; the flattened setæ recumbent. *Elytra* broadly ovate, widest about the middle, rather broadly rounded behind, the dorsal outline almost flat, the basal margin sinuate; the striæ very shallow, but the punctures deep and distinctly visible through the scaling; each interval with a row of numerous curved, or slightly raised, flattened setæ; the scales not larger than those on the pronotum. *Legs* with the tibiæ not denticulate internally, the apical mucro inconspicuous, the front pair with the apical teeth stout and extending a short distance up the external edge, the hind pair with the corbels distinctly enclosed, bare, the upper edge angulate at its base. *Sternum* with the front coxæ in the middle of the prosternum, the centro-sternal piece forming a small tubercle.

The ♂ smaller than the ♀ and a little narrower, and the last ventral segment slightly shorter.

Length 3·5–5 mm., breadth 1·6–2·25 mm.

S. Rhodesia: Buluwayo, xii. 1903 (*G. A. K. M.*).

Very similar in appearance to *P.* (*Strophosomus*) *convexicollis*, Fhs., but in that species there is a median furrow on the pronotum and at the apex of the rostrum.

So far as is known at present, Southern Rhodesia appears to be the northern limit of the genus *Protostrophus*. The present species was the only one met with at Buluwayo, and *P. mucronatus* was the only species found at Salisbury during many years' collecting. Further south the species are numerous, but I have seen none from the western districts of the Cape Province.

Protostrophus carinirostris, sp. n.

♀. Colour black, densely clothed with small, almost round scales, slightly overlapping in parts, those on the pronotum being distinctly larger than those on the elytra. Scaling on head and rostrum grey, with the costæ brownish; pronotum grey, with a broad median brown stripe; elytra mottled with fawn, grey, and brown, interval 1 entirely fawn, interval 3 with a more conspicuous grey spot behind the middle, and a similar one a little in front of it on interval 5; lower surface grey.

Head separated from the rostrum by a gently curved furrow, almost plane between the eyes, with a very broad and deep median furrow ascending to the vertex, flanked by a low costa and two more on each side of it (sometimes traces of a third); eyes very prominent and strongly produced backwards, deepest well behind the middle, the orbit narrow and not projecting behind. *Rostrum* a little shorter than its basal width, the lateral dorsal edges distinctly sinuate behind the antennæ and rather overhanging the sides; the dorsum strongly tricarinate, the outer carinæ nearer at the base to the median one than to the sides, and gradually curving outwards to join the lateral margins above the antennæ; the genæ rather broadly and deeply impressed. *Antennæ* piceous, rather densely squamose; the funicle with joint 1 about one-fourth longer than 2, the remainder bead-like, 3 a little longer than broad, 4 to 6 about as long as broad, 7 broader and transverse. *Prothorax* twice as broad as long, widest about the middle, the sides strongly rounded and deeply constricted close to the apex; the base arcuate, scarcely marginate, and much broader than the apex, which is shallowly sinuate dorsally and vertical at the sides; the rather rugose sculpture of the upper surface is hardly noticeable through the scaling, and a fine bare median carina runs from the base almost to the apex; the narrow flattened setæ entirely recumbent. *Elytra* broadly ovate, the sides slightly rounded, widest rather behind the middle, broadly rounded behind, and jointly sinuate at the base, the dorsal outline gently convex and continuous with that of the pronotum; the broad shallow sulci containing pupillate punctures that are perceptible through the scaling; the intervals convex, and each with two irregular rows of short recumbent setæ. *Legs* stout, densely squamose; the tibiæ not denticulate internally, and the mucro inconspicuous; the corbels of the hind pair narrowly enclosed, squamose, with the upper edge strongly angulate at the base.

Length 5–5·4 mm., breadth 2·75–3 mm.

NATAL: Frere, 1892 (*G. A. K. M.*).

Described from four specimens.

Most nearly allied to *P.* (*Strophosomus*) *sulcatifrons*, Mshl. (Proc. Zool. Soc. Lond. 1906, p. 914, pl. lxvi. fig. 2), which has the head and rostrum very similarly sculptured; but, apart from being nearly twice as large, that species has the pronotum deeply wrinkled longitudinally, with a broad median carina and the sides angulated; joint 2 of the funicle is nearly as long as 1, and 7 is as long as broad, etc.

Leurops sublineata, sp. n.

Colour variable; black with dense pale fawn or fawn-grey scaling; the prothorax usually with two broad dorsal paler stripes; the elytra sometimes almost unicolorous, but usually variegated with indefinite darker and paler markings, occasionally taking the form of macular stripes.

Head quite smooth, the close shallow punctation almost entirely hidden by the scaling, the forehead flattened, the setæ slightly raised; the eyes moderately convex, the posterior margin not raised above the level of the neck. *Rostrum* nearly as long as its basal width, strongly narrowed in front, with the sides gently sinuate and less perpendicular than usual, so that the genæ are more broadly visible from above; the upper surface with a rather deep median impression in the anterior half, containing a low scale-covered carina; the upper edge of the scape running well below the eye. *Prothorax* quite smooth, without any central furrow or carina, the scaling and setæ as on the head; the sides very gently rounded, the apex truncate dorsally and very shallowly sinuate behind the eyes. *Elytra* ovate, broadest about the middle, rather sharply acuminate behind, the basal margin jointly sinuate; the surface quite even, not striate, but with rows of separated punctures, each containing a minute seta and almost concealed by the scaling; the intervals flat, with irregular rows of appressed scale-like setæ, which are so short that usually the space between the apex of one and the base of the next is about as long as a seta.

Length 4·25 mm., breadth 2·25 mm.

ORANGE FREE STATE: Lindekwe Drift, xii. 1905 (*Harold Fry*); Modderpoort, 30. x. 1914 (type).

Described from eight specimens.

Very closely related to the rather larger *L. substriata*, Mshl. (Ann. & Mag. Nat. Hist. (9) i. 1919, p. 20), but in that species the rostrum is distinctly shorter, less strongly narrowed in front, with its sides straight and more nearly perpendicular, and the dorsal impression is much shallower; the posterior portion of the orbit of the eye is raised above the level of the neck; and the setæ on the elytra are much more conspicuous and longer, the apex of one frequently reaching the base of the next behind it.

In *L. cana*, Mshl. (*l. c.* p. 19), the rostrum is much less narrowed in front and thus appears longer, being almost oblong in shape, with steeply perpendicular sides ; the eyes are much less convex ; the prothorax more strongly narrowed in front ; and the elytra broader and flatter, and much less acuminate behind.

Leurops planoculis, sp. n.

♂ ♀. Colour black, with dense fawn-coloured scaling having a more or less distinct coppery reflection, and sometimes with a very ill-defined broad paler stripe on the disk of each elytron.

Head as in *L. sublineata*, but the central furrow more distinct, the setæ less conspicuous, and the eyes larger and almost flat, so that the hind edge can pass beneath the prothorax. *Rostrum* a little longer than its basal width, rather strongly narrowed in front, the sides faintly sinuate ; the upper surface with a rather large and deep median impression, containing the usual low scale-covered carina ; the line of the upper edge of the scrobe running only slightly below the lower margin of the eye. *Prothorax* quite smooth, with a trace of a bare median line in the basal half, rather strongly narrowed in front and with the sides gently rounded ; the basal margin rather strongly arcuate, the apex very shallowly sinuate in the middle, but not behind the eyes. *Elytra* in the ♂ very broad in proportion to their length, widest at the middle, markedly flattened transversely and broadly rounded behind ; in the ♀ ovate, narrower, widest before the middle, strongly convex transversely, and markedly acuminate behind ; there is only a trace of very shallow striæ, the punctures in them being distinct only near the base and becoming obliterated by the scaling behind ; the intervals with small, shortly ovate, and slightly overlapping scales, smaller than those on the prothorax, and irregularly set with very short recumbent scale-like setæ.

Length, ♂ 5·25–5·6 mm., ♀ 5·6–6 mm. ; breadth, ♂ ♀, 3·25–3·6 mm.

Transvaal : Johannesburg, 30. xi. 1918.

Described from three specimens submitted by the Division of Entomology, Department of Agriculture, Pretoria.

The largest of the five species at present known, and remarkable for the extreme flatness of the eyes and the marked sexual difference in the shape of the elytra.

Subfamily *LEPTOPINÆ.*

Genus ENICODERUS, Pér.*

This genus was placed by Dr. L. Péringuey in the subfamily *Tanymecinæ*, near *Siderodactylus*; but, despite a certain superficial resemblance, it has no real affinity with that genus, its nearest ally being *Leptostethus*, Waterh., in the *Leptopinæ*.

To the original description the following generic characters may be added:—*Head* with the eyes entirely lateral, the forehead very broad. *Rostrum* in a different plane from the head, but not separated from it by a furrow; scrobes curved downwards and ending far in front of the eyes; mandibles squamose at the sides and multi-setose, with a strong median tooth; mentum transverse, trapeziform, with two erect setæ. *Prothorax* with well-developed postocular lobes bearing a fringe of setæ. *Scutellum* small, but distinct, circular. *Elytra* with ten complete striæ, the basal margin carinate, the lateral margin not excised near the base. *Wings* entirely absent. *Legs*: front coxæ contiguous or very narrowly separated, hind coxæ meeting the elytra; tibiæ mucronate at the apex, the corbels of the hind pair terminal, squamose, and enclosed; the third tarsal joint broadly lobate, the claws free and squamose at the base. *Sternum* with the gular margin deeply sinuate, the coxæ nearer the front margin of the prosternum; the mesepisterna meeting the elytra, the mesepimera very much reduced; the metepisterna comparatively narrow and scarcely dilated at the base, the bounding suture distinct throughout; the metasternum between the coxæ as long as or longer than the mid-coxæ. *Venter* with the intercoxal process nearly as broad as the coxæ; ventrite 2 separated from 1 by a sinuate incision, and as long as 3+4.

The genus *Timus*, Pér. (Trans. S. Afr. Phil. Soc. 1892, p. 128), which is unknown to me, must be extremely closely related to *Enicoderus*; the only distinction given that may be significant is that the eyes are slightly prominent and have a small orbital ridge.

Enicoderus latifrons, sp. n. (Pl. XIII. figs. 9, 10.)

♂ ♀. Colour black, densely clothed with indefinitely variegated greyish-white, pale fawn, and brown scaling.

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* Trans. S. Afr. Phil. Soc. 1892, p. 127.

Head fawn-coloured, with an ill-defined median stripe and a narrow ring round the eyes whitish; rostrum mainly grey; prothorax greyish white with dark mottling on the posterior dorsal area and mainly fawn in front; elytra with the sutural and lateral margins fawn-coloured, the disk greyish white, with darker mottling.

Head with the forehead gently convex longitudinally and almost plane transversely, the sculpturing entirely hidden by the densely packed, deeply cup-like scales; when these are removed, the forehead is shiny and closely punctate throughout, the punctures on the vertex being confluent and rugose; the whole head set with sparse stiff erect bristles; eyes very broadly ovate, obtusely acuminate below, and only slightly convex. *Rostrum* longer than broad (7 : 5), the dorsal area gradually narrowed from base to apex, but the width across the genæ equal to the basal width; the dorsum gently convex transversely in the basal half only, the clothing and punctation similar to that of the forehead; the apical margin trisinuate and asymmetrical, the right lobe being longer than the left. *Antennæ* rather short and densely squamose; the funicle with joint 2 about as long as broad, scarcely longer than each of the four succeeding joints and shorter then 7. *Prothorax* broader than long, widest at the middle, the sides very strongly rounded in the ♂, less so in the ♀, markedly constricted near the apex, the constriction continued as a shallow furrow across the dorsum, and a similar furrow at the base; the basal margin arcuate in the middle and broader than the apical, which is also arcuate dorsally; the dorsum closely and coarsely granulate, with a shallow median furrow on the basal half; the scales irregular in shape, concave, and in parts cup-like; the setæ long, coarse, and erect. *Scutellum* densely squamose, elevated. *Elytra* subcylindrical in the ♂ and much narrower than the prothorax at its widest; broader in the ♀, with the sides more rounded, broadest about the middle and there as wide as or a little wider than the prothorax; the basal margin jointly sinuate, the external angles not projecting; the shallow striæ with very large round punctures, which are completely covered by the scaling but distinctly perceptible through it; the intervals when bare not broader than the punctures, each with a row of long erect setæ, the alternate ones slightly broader and higher; the scales broadly overlapping, with their margins turned up. *Legs* densely squamose and with long setæ; the front tibiæ with five teeth on the inner edge, the mid pair with three, and the hind pair with four; the tarsi with joint 2 transverse and not longer than 3.

Length 7–9 mm., breadth 2·5–3·5 mm.

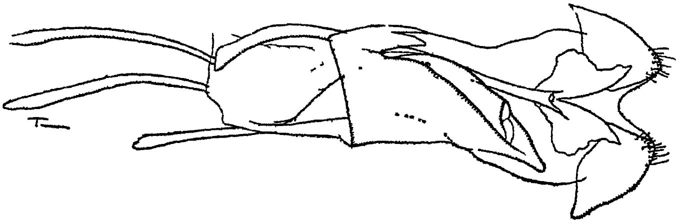
Cape Province: Willowmore (*Dr. H. Brauns*).

Described from ten specimens.

The genotype, *E. thoracicus*, Pér., is readily distinguished by the two remarkable tufted prominences on the pronotum (especially developed in the ♂), the angular lateral dilatation near the apex of the rostrum in the ♂, and by the elongate 2nd tarsal joint, which is longer than the 3rd *.

The very brief description of *Timus simplex*, Pér. (*loc. cit.*), would almost apply to *E. latifrons*, but the former species is stated to have a small orbital ridge above the eye and a lateral stripe of dense white scales on the elytra.

Fig. 1.



Enicoderus latifrons, sp. n.

The male genitalia of *E. latifrons* are shown in text-fig. 1, with the accessory parts, in the position of rest. On the extreme right is the divided 6th ventrite, corresponding to the 8th tergite; behind and above this is the irregular bifid plate from which arises the spiculum, a stout chitinised invagination of the membrane which lies beneath the genital tube, but with its free end curved round on to the dorsal surface, thus forming an effective support for the tube. The strongly chitinised median lobe, with its bluntly pointed apical spatula and two long curved posterior struts, is quite of the normal Brachyderine type, forming a closed tube; the sac projects a short distance behind the tube and is lined almost throughout with minute, closely set asperities; the tegmen forms a very narrow circular ring, the dorsal portion of which is produced forwards into a very slightly chitinised bifid process.

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* It may be noted that in this species the rostrum was described as bearing five carinæ, but the supposed median carina is really a furrow.

Subfamily *OTIORRHYNCHINÆ.*

Systates sexspinosus, sp. n. (Pl. XIII. fig. 12.)

♂ ♀. Colour shiny black, with markings composed of pale metallic-green scales; head and rostrum with sparse setiform green scales; pronotum with a few green scales scattered along the median line; elytra with a broad common sutural stripe of small separated scales, narrowing from the top of the declivity to a point near the apex, and a very irregular similar lateral stripe; underside with sparse green scales only on the prosternum and mesosternum.

Head with coarse, shallow, and usually confluent punctation, and a shallow median stria on the forehead, the vertex transversely striolate. *Rostrum* a little shorter than the head and separated from it by a rather shallow impression, about as long as broad, the apex and base of equal width, and the sides gently sinuate; the dorsum with very shallow confluent punctures, and with a faint central costa and an oblique one on each side in the ♂, these costæ almost obliterated in the ♀. *Antennæ* with the scape slender and gradually clavate: the funicle densely pubescent, with joint 1 rather longer than 2, the following being the order of diminishing length: 1, 2, 3, (5, 7), 4, 6; the club elongate, but little thicker than the funicle, and as long as 2½ of the preceding joints. *Prothorax* a little broader than long (5 : 4), subcylindrical, the sides gently rounded, broadest at the middle, the apex only slightly narrower than the base, both being truncate; the upper surface closely covered throughout with low granules, set with minute recumbent pale setæ. *Elytra* ovate, broadest before the middle, acuminate and jointly rounded at the apex; the base on a higher plane than the pronotum, sloping steeply forwards and without a defined margin; each elytron with two stout sharp forwardly-directed spines above the shoulder near the base, the anterior one being much the smaller, and a third, usually larger and sharper, backwardly-directed spine in the same line behind the middle; the rows of punctures very shallow and also irregular, except the three lying between the suture and the row of spines; the setæ extremely minute, except along the sutural area, where they are short and recumbent, becoming longer and erect towards the apex along the suture and lateral margins. *Legs* long and slender; owing to the flattening of the lower surface the hind coxæ are very widely separated and, as it were, pushed out laterally so that they are partly visible from above, especially in ♂;

the femora simple in ♀, the hind pair of ♂ very deeply sinuate internally at the base (to accommodate the projecting coxa), the sinuation terminating in a prominent tubercle, and the lower surface set with scattered irregular granules; in both sexes the anterior pairs of tibiæ armed below on the apical half with a row of closely set spines, the hind pair denticulate; in the ♂ only, the inner apical edge of the hind tibiæ is produced at right angles into a broad laminate process; the tarsi narrow and elongate, with the 4th joint paler and strongly compressed in the basal half. *Venter*: in the ♂, the 1st ventrite with an angular laminate perpendicular process behind the coxa, the 5th broadly rounded at the apex; in the ♀, the 1st ventrite with only a slight fold in the place of the process, and the 5th elongate and very sharply pointed at the apex.

Length 8·5–10·5 mm., breadth 3·6–4·8 mm.

NYASALAND: 4 ♂♂, 3 ♀♀, vii.–viii. 1895 (*A. Whyte*); Zomba, 1 ♂, iv. 1900 (*Cameron*), 6 ♂♂, 4 ♀♀, vii. 1913 (*E. Ballard*), 4 ♂♂, 3 ♀♀, vii. 1913 (*Dr. H. S. Stannus*).

Subfamily *HYPERINÆ*.

Genus FRONTODES, nov.

Head well exserted, so that the rounded convex laterally-placed eyes are remote from the prothorax, the forehead being broad, but rather narrower than the width of an eye or than the base of the rostrum. *Rostrum* much shorter than the head and not longer than broad, the dorsal outline sloping steeply downwards about the middle; the ill-defined epistome with two discal setæ, and the apical margin asymmetrical, there being a distinct projection on the right half; the scrobes lateral, short, deep, subtriangular, and sloping sharply downwards in front of the eye; the mandibles stout, smooth, shiny and rather prominent, each with a single lateral seta, and with a sharp apical tooth and a smaller one below it; the peduncle of the submentum short, broader than long: the mentum comparatively large, trapezoidal, broadest at the apex, the apical margin as long as the lateral edge and with a group of setæ on each side. *Antennæ* very short; the scape exceeding the middle of the eye, but not reaching the hind margin; the funicle with only six joints, the first longer and much thicker than the others; the club elliptical, 4-jointed, and longer than the four preceding joints. *Scutellum* small, triangular. *Elytra* much broader at the shoulders than the comparatively small thorax, bearing ten complete striæ, with the lateral margin excised for the reception of the base of the metepisternum, and the apices separately rounded, leaving the pygidium slightly exposed. *Wings* functional. *Legs* rather short; the front coxæ contiguous and in the middle of the prosternum, the hind pair not reaching the elytra; the trochanters without any bristle; the femora moderately clavate, unarmed; the tibiæ cylindrical, without any apical mucro, the corbels of the posterior pairs almost transversely truncate; the tarsal claws rather small, free, and simple. *Sternum* with the centro-sternal piece of the prosternum forming a small separate tubercle; the outer and posterior sides of the mesepimeron forming a very wide obtuse angle; the metasternum at its shortest as long as a mid-coxa, with a deep antecoxal impression, the base of the episternum only two-fifths the length of its side. *Venter* with the intercoxal process ogival and much narrower than the coxa; ventrite 1 separated from 2 by a deep sinuate incision; 2 as long as 3+4; 5 about as long as 3, gently sinuate at the apex in the ♂ only; 6 (withdrawn) entirely chitinised in the ♀, the unusually short forked strut being fused with its basal margin (text-fig. 3, *b*); in the ♂ 6 is also chitinous except along a median membranous strip (text-fig. 2, *b*); in the ♂ all the exposed ventrites bear a continuous longitudinal median impression.

Genotype, *Frontodes brevicornis*, sp. n.

The only known species looks like a small *Cepurus*, Schh., but in the latter genus the prothorax is much larger in proportion to the elytra; the eyes are elongate, transverse, not prominent, and approximated above; the apex of the epistome is not asymmetrical; the scape barely reaches the eye, and the funicle has seven joints, etc.

The only other genus in the subfamily that has only six joints in the funicle is the European *Limobius*, Schh., but it differs, *inter alia*, in its long rostrum, elongate depressed eyes, narrow forehead, etc.

It may be noted that the asymmetry of the margin of the epistome occurs also in *Hypera*.

Frontodes brevicornis, sp. n. (Pl. XIII. fig. 1.)

Colour piceous, with moderately dense grey-brown scaling (not entirely concealing the integument), each elytron with a very ill-defined grey transverse patch behind the middle.

Head with the forehead and the disk of the vertex flattened, coarsely punctate throughout, and clothed with pale scales and recumbent buff or brownish setæ; the strongly convex eyes deepest much behind the middle. *Rostrum* parallel-sided, the dorsal edges rounded, the basal half of the dorsum clothed with scales and setæ, the apical half (comprising the epistome) bare, shiny, and coarsely punctate. *Antennæ* setose and without scaling; joint 2 of the funicle a little shorter than 1, 3 and 4 each shorter still, 4 to 6 of about equal lengths but widening outwardly, 6 being distinctly transverse. *Prothorax* very slightly broader than long, the sides gently rounded, almost parallel in the basal half, the truncate apex much narrower than the gently arcuate base, the apical margin sloping obliquely backwards at the sides and without postocular lobes; the upper surface convex, with the apex a little lower than the base, shallowly and reticulately punctate, the intervals very finely shagreened, and without any median furrow or carina. *Elytra* broad, oblong-ovate, the shoulders rounded subrectangular, thence parallel-sided to beyond the middle; the striæ rather shallow, with deep separated punctures, the intervals slightly convex and evenly raised, with irregular rows of recumbent setæ, and with a low pre-apical callus; the scales subtriangular, not overlapping, and a little smaller than those on the prothorax. *Legs* with separated pale scales and recumbent setæ, the tibiæ usually with a dark band above the middle.

Length 5–6·5 mm., breadth 2·5–3·5 mm.

NATAL: Malvern (*C.N. Barker*—type); Umkomaas Mouth, ix. 1897 (*G. A. K. M.*). PORTUGUESE E. AFRICA: Caia, Zambesi R., ix. 1910 (*Dr. H. Swale*). UGANDA: Daro Forest, Toro, 4000–4500 ft., x. 1911 (*Dr. S. A. Neave*).

The male genitalia (text-fig. 2) are of a normal Hyperine type. The median lobe (*a*) is in the form of a very strongly arched, broad, open trough, which is abruptly narrowed at the functional orifice; on the lower surface near the orifice there is a median sharp longitudinal carina; the apex of the lobe is shortly pointed and the lateral margin on each side of it is broadly lobate; the struts are almost hinged at their junction and are a little longer than the lobe. The sac, when uneverted, extends backwards a little beyond the ends of the struts; the distal half is densely set internally with minute spicules, in front of which lie four symmetrically placed, elongate, longitudinal chitinous plates, the rest of the sac being simple. The tegmen is nearly membranous on the dorsal half of the ring, and its strut is about as broad as those of the median lobe, but only two-thirds the length. Its form is closely similar to that of *Ancylocnemis fasciculata*, sp. n. (text-fig. 4). The spiculum is shown (text-fig. 2, *b*) with the last (6th) ventrite folded beneath its base, in the normal position.

Fig. 2.

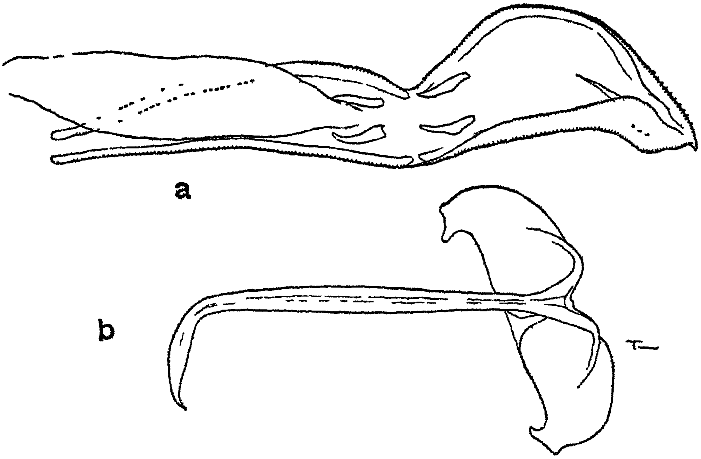
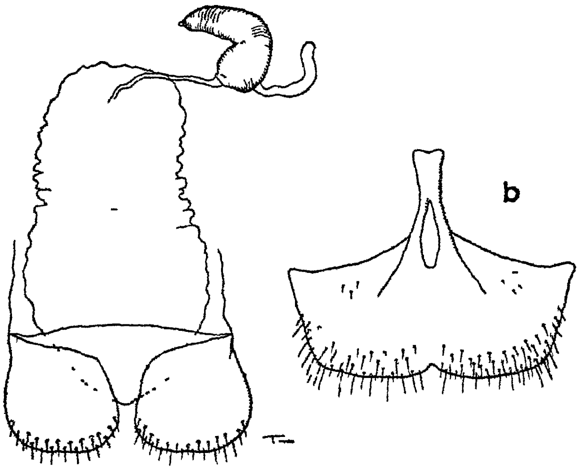


Fig. 3.



Frontodes brevicornis, sp. n.

The female genitalia (text-fig. 3, *a*) are remarkable for the great development and flattening of the apical palp-like organs (*cf.* text-figs. 5 and 7), which is no doubt correlated with the absence of any elongate extensile ovipositor, the vagina not being differentiated from the bursa copulatrix.

Subfamily RHYTIRRHININÆ.

Rhytirrhinus lobaticollis, sp. n. (Pl. XIII. figs. 7, 8.)

♂ ♀. Black, uniformly clothed with earth-brown scaling. *Head* completely concealed from above by the anterior thoracic lobe; the forehead excavated, with a high squamose fringe above the eyes, the vertex with two short longitudinal ridges formed of densely packed stout setæ, and a row of numerous similar setæ between them and the lateral margin; eyes rather coarsely facetted, semi-ovate, the posterior margin almost straight; the gular area very finely aciculate, and not transversely carinulate. *Rostrum* with a very broad and deep median furrow, occupying almost the whole dorsal width and bounded laterally by a ridge bearing a dense mass of erect scales; an almost equally broad and deep lateral furrow above the scrobe, the latter densely squamose throughout; the epistome convex and without any defined boundary. *Antennæ* comparatively long and slender; the scape just reaching the eye, slender in the basal two-thirds, gradually clavate at the apex, and bearing the usual erect setæ; the two basal joints of the funicle longer than the rest together, joint 1 as long as the club, 2 as long as 3–5 together, 3 elongate, 4–6 bead-like and a little longer than broad, 7 transverse. *Prothorax* a little longer than broad (9 : 8); the dorsum concave, with all the margins except the base strongly raised; the anterior portion produced into a long broad lobe considerably exceeding the head, its apex deeply sinuate, and its edges bearing clumps of matted erected scales; the lateral margins similarly produced, but the lobes shorter and broadly truncate, or with the posterior clump of scales higher than the anterior one; in the middle of the base two short high longitudinal ridges of matted scales, and on each side of the disk a similar transverse, slightly oblique ridge; the centre of the anterior lobe, which is the deepest part, set with numerous erect broadly spatulate scales; the shallow reticulate punctation hidden by earthy indumentum, and more readily visible on the pleuræ, on which there are two small prominent tubercles bearing tufts of matted scales. *Elytra* with four tubercular projections at the base and jointly rounded at the apex, with rows of prominent tubercles on the disk; along the suture a row of five or six very small ones, a large conical one at the top of the declivity (uniting at its base with its fellow on the other elytron), and two small ones on the declivity; the next row with six or seven tubercles, ceasing before the declivity, the basal three small, the others large and conical; the third row with nine or ten tubercles, all large and conical, especially the basal one; the fourth with a very large composite humeral tubercle, a medium-sized one just behind, followed by three or four very small ones; finally, a prominence between the humeral tubercle and the lateral margin; all these tubercles clothed with erect matted scales; between the rows there are very shallow irregular paired rows of large quadrate reticulate foveæ; the inflexed sides with three complete rows of similar foveæ and an incomplete external row. *Legs* densely squamose; the femora with scattered larger fluted scales, and with sparse long setæ on the lower surface only; the tibiæ with long suberect setæ above and below.

Length 6–8 mm., breadth 3–4 mm.

Cape Province: Cape Flats (type); Stellenbosch (*Dr. L. Péringuey*).

Described from four specimens.

This aberrant species may be readily distinguished from all the previously described South African forms by the very remarkable structure of the prothorax and the numerous conical tubercles on the elytra.

The surface of the body appears to be capable of exuding a glutinous substance which causes small pebbles to adhere to it.

Subfamily *Erirrhininæ*.

Bagous fragosus, sp. n.

Colour black, with dense earth-brown scaling, sometimes with indefinite darker patches.

Head regularly convex, the forehead scarcely flattened, and with a shallow central impression that is more or less filled in with the scaly indumentum. *Rostrum* shorter than the prothorax, moderately curved, shallowly and reticulately punctate, and without any longitudinal furrows or impressions, the lower margin of the side forming a sharp edge. *Antennæ* inserted at the middle of the rostrum. *Prothorax* as long as broad, very deeply constricted and transversely impressed near the apex, the posterior portion subquadrate, with a slight lateral projection just behind the constriction; the upper surface uneven, granulate, with a very shallow broad median longitudinal impression, and a transverse impression behind the lateral prominence on each side; the apical margin truncate dorsally, the base gently arcuate. *Elytra* short oblong, the basal margin jointly sinuate, the shoulders roundly prominent, the sides subparallel from there to beyond the middle and strongly compressed inferiorly at the apex; the upper surface with fine shallow striæ, the punctures in which are not visible through the scaling; the alternate intervals slightly more raised than the others, and in the basal third a very shallow oblique impression running from the shoulder to stria 1, the suture being evenly raised throughout; on interval 3 there is a low elevation behind the middle and another just behind it at the top of the declivity, and also a prominence on interval 5 on the declivity. *Legs* densely clothed with brown scaling; the anterior pairs of tibiæ with a stout spine-like tooth in the middle and a much smaller tooth midway between this and the apex, each tooth bearing a stout seta; the hind tibiæ merely angulate in the middle; the tarsi short and not specially slender, joint 3 not emarginate and about as long and broad as 1, joint 2 much shorter but scarcely narrower.

Length 2·2 mm., breadth 1 mm.

IVORY COAST: Dimbokro (type). FRENCH CONGO: Fort Crampel.

Described from two specimens kindly submitted to me by M. A. Hustache.

Differing from all the previously described African species of the genus in the spine-like tooth on the tibiæ. In my notes on the African *Bagous* (Proc. Zool. Soc. Lond. 1906, pp. 939–940), I inadvertently omitted any reference to *B. niloticus*, Auriv. (Swedish Zool. Exp. Egypt, no. 10 *a*, p. 16, 1905), with which I am not acquainted.

Subfamily *ANTHONOMINÆ*.

Genus ANCYLOCNEMIS, nov.

Head globular, well sunk in the thorax; eyes gently convex, not raised above the outline of the head, entirely frontal in position, very narrowly separated and rather coarsely facetted. *Rostrum* elongate, subcylindrical, deflected, and gently curved; the apical margin truncate, with a fovea on each side containing a single minute seta; scrobes linear, deep, passing rapidly beneath the rostrum, but broadly separated at the base, and not continued beyond the antennæ; mandibles tridentate; the buccal cavity widening from base to apex; the peduncle of the submentum much longer than broad, about twice as long as the small subcircular mentum. *Antennæ* inserted well beyond the the middle of the rostrum in both sexes; scape long, slender, cylindrical, gradually clavate at the apex, as long as the funicle, but not reaching the eye; funicle 7-jointed; club elliptical, 3-jointed, with the incisions transverse. *Prothorax* broader than long, the apex much narrower than the shallowly bisinuate base; the apical margin truncate and without postocular lobes. *Scutellum* small, elevated. *Elytra* subtriangular, much broader at the shoulders than the base of the prothorax, thence rapidly narrowing behind; the apices separately rounded, the lateral margins not sinuate; ten complete striæ. *Wings* functional. *Legs* stout, moderately long; the front coxæ contiguous, the mid pair narrowly separated, the hind pair very widely so and meeting the elytra; the femora very thick, pedunculate at the base, the anterior pairs with a short stout tooth, the hind pair with a very large triangular one; the tibiæ much compressed, both upper and lower margins angulate, the apex strongly uncinate; the corbels of the hind tibiæ situated on the inner face, large, bare, narrowly enclosed, being bounded externally by a sharp carina; the tarsi squamose, the 3rd joint very broadly bilobate, the 2nd longer than broad, the 4th as long as the 2nd; the claws rather small, strongly divaricate and appendiculate at the base. *Sternum* with the gular margin deeply sinuate, the coxæ situated in the middle of the prosternum, and no centro-sternal tubercle; the mesosternum sloping very steeply, almost perpendicular, the central process forming a low vertical tubercle with a bifid tuft of scales, the episternum almost an equilateral triangle, the epimeron about one-third smaller; the metasternum at its shortest rather longer than the mid-coxæ, the episternum rather broad and angulate internally at the base. *Abdomen* with the ventrite 1 nearly as long as 2–5 together, the intercoxal process very broadly truncate, broader than the coxæ; ventrite 2 separated from 1 by a deep bisinuate incision, but immobile and shorter than 3+4; 5 as long as the three (♂) or two (♀) preceding ventrites, and broadly rounded at the apex in both sexes; ventrite 6 (withdrawn) membranous, with

Genitalia : in the ♂ (text-fig. 4, *b*) the median lobe is arched, strongly chitinized above, but almost membranous beneath, broadly spatulate beyond the orifice, the spatula with a long backwardly-directed tooth on each side ; the struts long, slender, and rather sinuous, somewhat longer than the median lobe ; the sac projecting far beyond the base of the median lobe, without any armature, but with a large transfer-apparatus ; the tegmen slender, the ring membranous on its dorsal third, the strut similar to, but a little shorter than, the struts of the median lobe ; the spiculum strong and broad, widely forked at the base and curved like

Fig. 4.

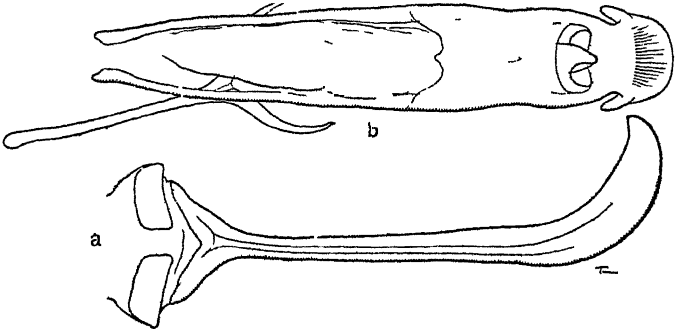
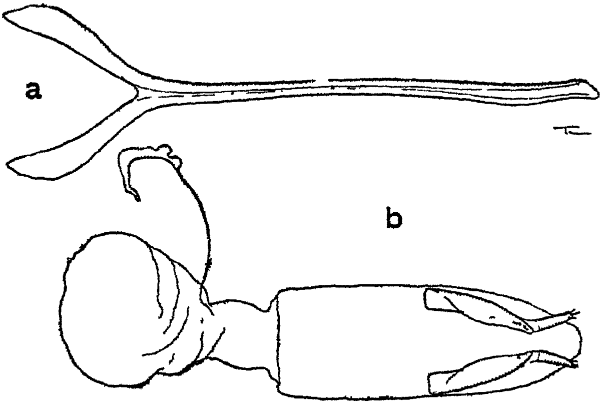


Fig. 5.



Ancylocnemis fasciculata, sp. n.

a hockey-stick at the apex (text-fig. 1, *a*). In the ♀ the vagina and bursa copulatrix are entirely membranous, only the two palps being feebly chitinized (text-fig. 5, *b*); but the supporting strut is stout, straight, and broadly forked at the base (text-fig. 5, *a*); the receptaculum is very small, slender, and irregular in shape (text-fig. 5, *b*).

Genotype, *Ancylocnemis fasciculata*, sp. n.

In the systems of both Lacordaire and Leconte, this genus is referable to the *Anthonominæ*, but it presents no special affinity with any of the other genera in the subfamily, being distinguished among other things by its closely approximated eyes, the striking armature of the legs, and the very broad intercoxal process of the venter.

In its general features it more resembles some of the broader species of the Oriental genus *Acicnemis*, Fairm., which also exhibit the large tooth on the hind femora and the broad ventral intercoxal process; but they differ in having the eyes distinctly separated, a well-marked postocular thoracic lobe, an abbreviated 10th stria on the elytra, simple and non-divaricate claws, etc.

Ancylocnemis fasciculata, sp. n. (Pl. XIII. fig. 2.)

♂ ♀. Ground-colour piceous, covered with dense greyish-brown scaling, variegated with paler markings and with numerous tufts of scales. Head and prothorax with buff scaling, the latter with a broad median conical brown patch, which is narrow on the front margin and rapidly widens to the base, and with a few white scales in the middle of the base; scutellum with white scaling; the elytra with grey-brown scaling, mottled with buff and whitish scales towards the sides and apex, with a quadrate dark brown sutural patch just before the middle and a similar buff or whitish patch immediately behind it, which is shortly extended along the suture, the shoulders with a patch of overlapping buff scales; the lower surface with buff or light brown scaling; the legs either grey or buff, mottled with brown.

Head with two small scale-tufts on the vertex; the space between the eyes about as broad as the scape at its middle. ***Rostrum*** of ♂ coarsely and confluently punctate throughout, with a well-marked smooth median carina almost reaching the apex, and a sharp lateral carina from the base to the antennæ; in the ♀ rather longer and more slender, finely and sparsely punctate in the apical half, the carinæ much less distinct, the median one disappearing beyond the sided from the base to beyond the middle, thence abruptly narrowed and constricted; the base shallowly bisinuate, the apex truncate dorsally, the longitudinal outline gently convex; the whole surface with coarsely reticulate punctures (almost entirely hidden by the scaling), without any median furrow or carina, and with eight scale-tufts: two on the front margin, one on each edge of the brown stripe; one on each of the lateral angles formed by the narrowing of the sides; two dorsal ones in the same transverse line with the latter pair, and placed on the lateral edges of the brown patch; and a smaller dorsal pair mid-way between these and the base. *Scutellum* narrow, densely scaled, with the base raised into a small bare prominence *Elytra* with the base jointly trisinuate, the shoulders roundly prominent, the sides gently rounded, and the apices divergent; the striæ shallow, containing very deep separated punctures, visible through the scaling, and each bearing a small black granule on each side when the scaling is removed; the intervals almost flat, rugosely punctate beneath the scaling, becoming granulate towards the base, with the following scale-tufts: interval 2 with two small ones before the middle, a large one at the middle, and another not far behind it; 4 with a row of five; 6 with one behind the shoulder and another at the middle; and 8 with one behind the shoulder, another before the middle, and a third towards the apex. *Legs* reticulately punctate and densely squamose; all the tibiæ with a stout squamose tooth on the dorsal edge not far from the base, both the anterior pairs angulate at the middle on the lower edge and with a short external apical projection, and the hind pair with a very long sharp tooth beyond the middle on the lower edge.

Length 3·5–4·5 mm., breadth 2–2·4 mm.

CAPE PROVINCE: Willowmore, iv. 1901 (*Dr. H. Brauns*); Uitenhage, xii. 1903 and ii. 1904 (*Father J. A. O'Neil*). S. RHODESIA: Salisbury, ix. 1900 (*G. A. K. M*). PORTUGUESE E. AFRICA: Beira, vi. 1900 (*P. A. Sheppard*—type), xi. 1900 (*G. A. K. M.*). TANGANYIKA TERRITORY: Meru, xi. 1905 (*Dr. Y. Sjöstedt*).

Described from fifteen specimens.

Subfamily ALCIDINÆ.

Alcides lixiformis, sp. n. (Pl. XIII. fig. 11.)

♂ ♀. Ground-colour black, with the elytra, anterior margin of prothorax, apex of femora, and the tarsal claws red-brown; the whole clothed with cream-coloured scales of varying density and dusted with yellow powder, and with the following ill-defined darker markings due to the scales being narrower or more sparse, so that the ground-colour shows through: a broad discal stripe on the prothorax, extending outwardly as far as stria 4 of the elytra at the base and narrowing to the apex; on the elytra a large basal patch extending from stria 3 to 8, and an oblique one extending from the suture before the middle to stria 7 behind the middle.

Head with close shallow confluent punctation, the forehead flattened and with a central fovea. *Rostrum* about as long as the prothorax in the ♀, a little shorter in the ♂, moderately stout, almost straight, coarsely and confluently punctate throughout in both sexes, the basal third with fairly dense scaling. *Antennæ* with joint 1 of the funicle nearly as long as the next three together, joints 3–6 transverse and subequal, 7 closely annexed to the club and as long as its two basal joints. *Prothorax* a little broader than long (5 : 4), parallel-sided from the base to beyond the middle, thence narrowing with a curve and constricted at some distance from the apex, the apical margin gently arcuate dorsally; the upper surface beneath the scaling dull and shagreened, and uniformly set with small separated rounded granules, except the apical area which is punctate; all the scales fringed at their tips. *Scutellum* slightly elevated, trapezoidal, broadest at the apex, bare. *Elytra* cylindrical, nowhere wider than the thorax, and the sides forming practically a continuous line with those of the latter; the shallow striæ with deep oblong separated punctures, the intervals rugulose and only a little broader than the septa between the punctures, but the sculpture mostly hidden beneath the scaling; a broad shallow circum-scutellar impression, and a deeper one at the base of striæ 4 and 5; the scales ovate, narrowed and shortly fringed at the tip. *Legs* rugose, fairly densely clothed with elongate scales; the femoral tooth well developed, that of the front pair the largest and with an additional small tooth at its base; the front tibiæ sharply angulate at the middle on the inner edge, the posterior pairs straight internally.

Length 8·25–11 mm., breadth 3·2–4 mm.

S. Rhodesia: Salisbury, 1893 (*G. A. K. M.*).

Belongs to the group of cylindrical species represented by *A. sparsus*, Boh., and *A. exilis*, Boh., but distinguished by its much larger size, very different and *Lixus*-like colouring, and its simple mid and hind tibiæ.

Subfamily *XIPHASPIDINÆ*, nov.

Genus XIPHASPIS, nov.

Head exserted, strongly constricted behind the eyes, which are large, transverse, and with their upper edge raised above the level of the vertex. *Rostrum* normally deflected at a right angle to the long axis of the body, nearly as long as the pronotum ; the scrobes extending narrowly a short distance in front of the antennæ, but behind them broad and passing almost immediately beneath the rostrum ; mandibles somewhat exserted, bidentate, bare ; peduncle of the submentum forming an almost equilateral triangle, the mentum small and extremely narrow, bare and smooth. *Antennæ* inserted at the middle of the rostrum in both sexes ; the scape as long as the funicle and not nearly reaching the eye ; the club very large, longer than the funicle, solid and subcylindrical. *Prothorax* transverse, strongly narrowed in front and sloping steeply forwards, bisinuate at the base and fitting closely to the elytra, without postocular lobes. *Scutellum* very long and dagger-like, extending for more than one-third the length of the elytra, and gradually tapering to a sharp point ; the base broadly raised and produced narrowly on each side along the base of the elytra as far as interval 2. *Elytra* subquadrate, broader at the shoulders than the base of the prothorax, very deeply and jointly trisinuate at the base, separately rounded at the apex, deeply sinuate on the lateral margins, and with only nine striæ, the 2nd and 9th alone uniting at the apex. *Wings* functional. *Legs* with the front coxæ contiguous, the mid pair very widely separated, slightly more so than the hind pair, which are separated from the elytral margin by a distance much greater than their own width ; the femora gradually clavate, each with a sharp tooth, the hind pair not reaching the apex of the elytra ; the tibiæ rather compressed and mucronate ; the tarsi normal, moderately slender, joint 2 as long as or longer than broad, 3 rather wider, 4 nearly as long as the rest together, the claws strongly appendiculate. *Sternum* : the front coxæ very close to the hind margin of the prosternum, with no centro-sternal tubercle ; central mesosternal piece almost vertical and very broadly truncate behind, the side-pieces fused together, the mesepimeron slightly ascending ; the metasternum between the coxæ nearly twice as long as the mid-coxæ, very deep dorso-ventrally, the episternum consequently very broad and completely fused with the unusually large epimeron (shaped like an elongate isosceles triangle), which is broader transversely than the hind coxa and widely separated from it. *Abdomen* likewise very deep, and the venter very short proportionately in the median line, being there only as long as (♂) or slightly longer than (♀) the metasternum; on the same line, ventrite 2 as long as (♂) or shorter than (♀) 3 + 4, and ventrite 5 shorter than 2 in ♂ and as long as 2 + 3 + 4 in ♀; ventrites 2–4 gradually increasing in length up to the elytral margin, but 5 narrowing outwardly to a point in the ♀ (Pl. XIII. fig. 5), whereas in the ♂ it widens rapidly till on a line with the base of tergite 8 and thence narrows to a point at its junction with the base of tergite 7; the pygidium very broadly exposed, 2 mm. long, formed in the ♀ of the 7th tergite, which is quite perpendicular and narrows to a point at its apex; in the ♂ the 7th tergite is perpendicular, but the 8th slopes sharply inwards beneath the abdomen, being about as long as its basal width and broadly rounded at the apex; the dorsum in both sexes strongly chitinized and the tergites closely interlocked, so that the abdomen forms a rigid box, like in *Apoderus*.

Genotype, *Xiphaspis longiclavis*, sp. n.

The species upon which this genus is founded is so aberrant and presents so little real affinity with any other genus known to me that it seems necessary to place it in a distinct subfamily. The broadly exposed pygidium, the strongly appendiculate claws, the broadly truncate and vertical mesosternal process, the mucronate tibiæ, and the form of the rostral scrobes, all approximate it to *Trigonocolus*, Lac., next to which it may provisionally be placed; but the quite unusual development of the scutellum, the very remarkable *Apoderus*-like form of the body (Pl. XIII. fig. 5), the presence of only 9 striæ on the elytra, the entirely different structure of the antennæ and tarsi, etc., abundantly distinguish it from the *Trigonocolinæ*.

Xiphaspis longiclavis, sp. n. (Pl. XIII. figs. 3–5.)

♂ ♀. Ground-colour rather shiny black, the elytra and abdomen red-brown; the prothorax clothed with large overlapping oval yellowish scales, except the dorsal anterior margin, a large median patch, and three small ill-defined lateral spots, on which the scales are replaced by recumbent yellowish setæ; the scutellum with similar dense scales concealing its base; the elytra with a broad stripe of large yellowish scales on interval 2 from the end of the scutellum to the apex, and with narrow stripes of about the same length, but of small scales on intervals 1, 4, 6, and 8; the basal margin also unevenly clothed with yellow scales; the lower surface and pygidium densely covered with similar large overlapping scales, except on a raised area on the metepisterna.

Head with coarsely reticulate punctures; forehead at its narrowest narrower than the antennal club, strongly convex longitudinally, a little higher than the eyes in front, but broadly impressed on its posterior slope; eyes oval, nearly twice as broad as long, strongly convex. *Rostrum* gently curved, parallel-sided from the base to the antennæ, markedly tapering beyond this in ♀, but not or only slightly so in ♂; in lateral view, the depth distinctly greater than the basal width, slightly diminishing from the base to the middle, and thence rapidly flattening to a point; the sides and upper surface with very coarse reticulate punctation, which is slightly reduced at the apex in the ♂, and gradually converted into very fine scattered punctures in the apical third in the ♀. *Antennæ* piceous, the scape slightly compressed, gradually clavate; the funicle with the two basal joints short, of equal length (seen from below), but the 1st thicker; the remaining joints all transverse and approximately equal; the club three times as long as broad, with velvet-brown pubescence. *Prothorax* almost parallel-sided for a short distance from the base, thence rapidly narrowed and constricted close to the apex; the apical margin truncate dorsally and sloping obliquely backwards at the sides; the whole surface with coarse reticulate punctation. *Scutellum* with the raised basal area separated from the rest by a deep transverse incision, which is completely hidden by the basal patch of scaling; the bare portion very deeply reticulate. *Elytra* somewhat longer than broad, widest at the roundly rectangular shoulders and shallowly sinuate behind them, so that the sides of the abdomen are narrowly visible directly from above; the basal margin very deeply trisinuate, being produced into a prominent angle at the base of interval 4; the deep striæ indistinctly punctate, the intervals convex and very rugosely punctate, 3, 5, 7, and 9 being more raised and broader than the others, except 2, which is as broad but flattened; a very shallow impression near the base on interval 4. *Sternum* with strong honeycomb reticulation throughout, each fovea covered by a large scale ; the metasternum with a median furrow, the episterna so strongly convex in the middle that

Fig. 6.

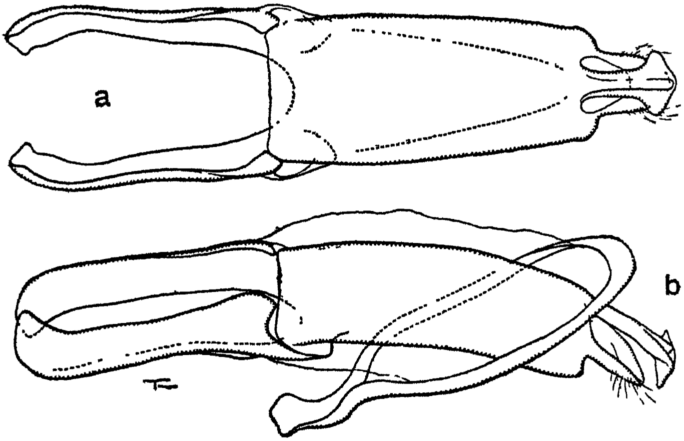
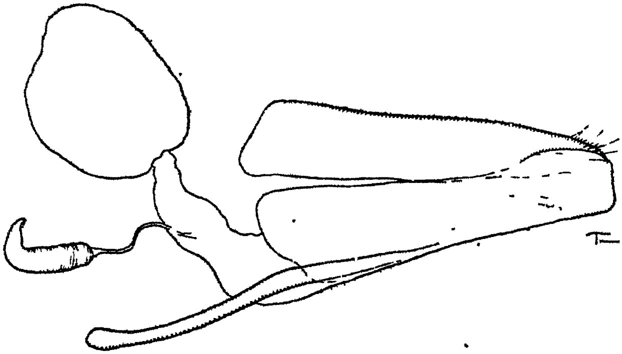


Fig. 7.



Xiphaspis longiclavis, sp. n.

the resulting bosses are visible on both sides at the same time when viewed from above.

Length 5 mm., breadth 3 mm.

S. Rhodesia : 4 ♂ ♂, 4 ♀ ♀, Salisbury, 5000 ft., xi. 1897

(*G. A. K. M.*—type). N.W. Rhodesia : 1 ♂, Chilanga, 1913 (*R. C. Wood*). Tanganyika Territory : 1 ♂, Usangu District, 3500–1500 ft., xii. 1910 (*Dr. S. A. Neave*).

The single male from Tanganyika Territory has the rostrum slightly longer and more slender than in the southern specimens.

As might be anticipated in such an isolated form, the genitalia present various peculiar features. In the male (text-fig. 6) the median lobe is a stout gouge-like structure, convex above and concave below; at the orifice it is strongly and abruptly constricted to form a setose lower lip, which is covered by a movable spatulate process arising from the dorsal edge of the orifice; the struts are unusually broad dorso-ventrally, plate-like, and slightly concave on the internal face. The sac is contained entirely within the body of the median lobe, and appears to be quite simple and without asperities. The tegmen is also very remarkable; instead of the usual vertical circular ring with a strut at right angles to it, the ring is exceptionally large and oval, lying almost horizontally in a position of rest, and the short broad gouge-like strut is in the same plane with it. Another striking feature is the complete absence of the spiculum. The 6th ventrite is only lightly chitinized on its apical half, which is deeply sinuate in the middle and entirely devoid of setæ.

The female (text-fig. 7) has the bursa copulatrix abruptly dilated into a balloon-like sac, the duct to the receptaculum seminis emerging before the dilatation; the minute and scarcely chitinized apical palps are enclosed within the closely appressed sides of the unusually long and compressed 6th ventrite which has a long strut. The 8th tergite, which is also unusually long and narrow, is much more firmly attached than usual to the 6th ventrite, and this structure suggests that these two sclerites function together as an organ of oviposition.

The absence of the spiculum in the male is such an exceptional character that I sent a male to Dr. David Sharp for dissection, and he has kindly confirmed the point, adding that in his numerous dissections of male *Curculionidæ* he has noted the absence of the spiculum only in certain genera of *Calandrinæ*, which accords with my own much more limited observations. Dr. Sharp also remarks that the structure of the median lobe in this species is quite unlike anything else that he has seen.

EXPLANATION OF PLATE XIII.

Fig. 1. *Frontodes* (g. n.) *brevicornis*, sp. n.
Fig. 2. *Ancylocnemis* (g. n.) *fasciculata*, sp. n.
Fig. 3. *Xiphaspis* (g. n.) *longiclavis*, sp. n.
Fig. 4. Ditto. Antenna.
Fig. 5. Ditto. Side view.
Fig. 6. *Iphisomus manicanus*, sp. n.
Fig. 7. *Rhytirrhinus lobaticollis*, sp. n
Fig. 8. Ditto. Side view of head and thorax.
Fig. 9. *Enicoderus latifrons*, sp. n., ♂.
Fig. 10. Ditto. Side view of head and thorax.
Fig 11. *Alcides lixiformis*, sp. n.
Fig. 12. *Systates sexspinosus*, sp. n., ♂.

XLIII.—*New Rhopalocera from Central Ceram.*

By George Talbot, F.E.S.

[Plates XIV.-XIX.]

Early in 1919 Mr. J. J. Joicey sent three collectors to the East, in the persons of Messrs. Felix, Charles, and James Pratt. The two first-named had already had considerable experience of tropical collecting. It was decided that they should attempt to reach the higher slopes of the mountains in the interior of Ceram, and, if successful, to spend a few months making collections of Lepidoptera for the Hill Museum.

After much difficulty the three brothers established a camp on the Manusela Range at 6000 feet, and were able to start collecting in October. The first collection made during October and November contained a few striking novelties, and these we describe in the present paper. A much larger collection of about 15,000 specimens is on its way to us, and consists largely of moths.

Messrs. Pratt have recently left Ceram for Dutch New Guinea, where the search for Lepidoptera is to be carried on in an almost unknown territory.

The types of the forms here described are in the Hill Museum, Witley.

Troides procus, Roths., ♂. (Pl. XIV. fig. 1, ♂; Pl. XV. fig. 2, ♀.)

Troides procus, Rothschild, Nov. Zool. xxi. p. 262 (1914) (interior of Ceram), ♀.

The male of this magnificent species is the most interesting discovery made by Messrs. Pratt on Ceram. Although the colour and pattern exhibits a relationship to the *goliath* group from New Guinea, the formation of the cell of the hind wing and the special pattern of the female seem sufficient to indicate the specific distinction of this form.

The cell of the hind wing is longer and narrower than in any other species of the group; upper discocellular longer, and middle and lower discocellular shorter than in other forms.

Upperside with general pattern of *goliath* group. *Fore wing* with green costal area as in *supremus*, but less green along upper part of cell and distally of this. Postdiscal and median green area as in *supremus*, its outer edge straighter and further from the margin, and less sharply defined. *Hind wing* with black marginal border wider than in other forms; green markings more extended than in *supremus*, the veins being more heavily marked, and the distal edge of the amber-coloured area being wider and extended round the apex; three postdiscal spots placed as in *supremus*, entirely green and mostly touching the vein-streaks of 4, 5, and 6; a green streak in cell along its lower edge.

Underside.—*Fore wing* as in *supremus*, but more greenish. *Hind wing* as in *supremus*, but green marginal area twice as broad, the veins more strongly edged with green distally, some green scaling along costal edge, cellule 2 nearly filled in with greenish yellow except for a small amber spot or streak. The postdiscal spots are placed a little further from the green margin than in *supremus* and are black edged with green.

Head, thorax, and abdomen as in allied forms. The scent-gland and hair are of the same colour as in *supremus*.

Length of fore wing 97–103 mm.

The ♀ measures 116 mm., but a specimen has been obtained which is said to measure 120 mm. (about 4¾″), making an expanse of 9½ inches. This is second only in size to *alexandræ*, which has attained a maximum length of fore wing of 135 mm.

Described from 3 ♂ ♂ obtained on the Manusela Range, Central Ceram, 2500 feet, October and November.

We append some notes made by the collectors :—

"With regard to *O. procus*, the insect seems to be very rare, but is most easily obtained in the open country at the foot of Mount Moekele at 2500 feet. It is obviously not a coast insect, but is a fairly low form corresponding to the true *goliath*, *titan*, *supremus*, and *samson* forms in New Guinea. This is not the case with *joiceyi*, which is apparently only found in the steaming valleys surrounding the higher ranges, and we think it doubtful if it descends below 4000 feet. *O. rothschildi*'s limit is probably 5000 or even 6000 perhaps.

"With *procus* it is interesting to note that the male bears a delicate perfume which is hard to define. It is not like any particular flower, yet is distinctly pleasant to the human sense. Perhaps the best way to describe it is as the scent emanating from a hothouse of living plants. This characteristic is perhaps not peculiar to *procus*, but we have never noticed it before in any others. Perhaps it has been overlooked, as the scent is only perceptible on placing the wings to the nostrils. There is no smell noticeable in *priamus* and *helena*."

Papilio weiskei stresemanni, Roths., ♀. (Pl. XVI. fig. 3.)

Papilio weiskei stresemanni, Roths. Lep. of B.O.U. & Woll. Exp. p. 4, pl. i. fig. 15 (1915) (Central Ceram), ♂.

The female of this interesting form is a little more differentiated from the male than is the female of the type form.

Upperside.—Ground-colour paler than in the male. *Fore wing* with spots more greenish, the subapical costal spot without a tinge of blue, the discal spot in cellule 3 smaller and sometimes absent. *Hind wing* without any blue tint, markings green; submarginal spots much larger, the anterior spot round and buff-coloured.

Underside: not much paler than in the ♂. *Fore wing* with submarginal spots buff-coloured.

Length of fore wing 38–42 mm.

Described from a series collected in Central Ceram, Mount Manusela, 6000 feet, October and November.

Delias joiceyi, sp. n. (Pl. XVII. figs. 6–7, ♂, fig. 8, ♀; Pl. XVIII. figs. 9–12, ♀.)

♂. *Upperside.*—*Fore wing* grey-white, narrowly edged with black except on inner margin. *Hind wing* bluish white, fringes black, some black scaling at the anal angle.

Underside.—*Fore wing* black. A subapical row of five yellow lunulate spots placed in cellules 3–7, the two near the costa only divided by the vein and larger than the others. A basal cell-streak of dark greenish yellow composed of short hair, and mixed with this are some white scales which extend a little beyond the basal streak and along the costa to within a short distance of the subcostal. The inner margin (cellule 1 *a*) is white to near the outer angle, which is margined by a thin white line reaching to vein 2; there is some white scaling in the basal half of cellule 1 *b*, and a short white streak at extreme base of the median. *Hind wing* with black ground-colour. A long red basal streak below the costal, and a little beyond it a red spot forming the first of a postdiscal band which is placed almost as in *negrina*, Fabr. This band is composed of seven spots; the second and third are curved or comma-shaped, the fourth ∠-shaped or slightly so, the fifth is placed more inward and separated from the fourth, its upper end generally touching the end of the cell, its lower end joined to the sixth spot which is nearly straight, and which is slightly separated from the seventh spot, this last spot is curved and ends in a point at the submedian. Base of wing in præcostal area powdered with yellow scales which extend between cell and lower proximal end of basal streak, into the cell at base and more thickly at its middle and upper end, and over the whole of the inner margin to near the anal angle. This yellow powdered area is bordered distally by a white band which is sharply defined along its outer edge; this band extends from vein 6 to near the submedian, fills the base of cellule 5, to a less extent the base of 4, does not fill the end of cell, fills the base of 2, and extends proximally a little beyond vein 2. The outer margin is broadly bordered with yellow and is connected with the basal yellow area by some scattered scales at the anal angle.

The pattern of the hind wing thus described is very similar to what is seen in *negrina* as regards the basal streak and the red postdiscal band which lies in a broad curved band of black ground-colour. The fore wing too is similar, but has much less white scaling and much smaller yellow spots to the subapical band.

Head black, with yellow hair; palpi black, fringed with yellow and black hair; antennæ black; thorax black, with grey hair above and yellow hair below; abdomen white, with dorsum black on basal half.

♀. *Upperside.—Fore wing* with black ground-colour. A red submarginal band which extends from the subcostal to the inner margin in most specimens, but may stop at vein 3. It varies from pale orange in some specimens to brick-red in the majority. The three anterior spots are wedge-shaped, their points placed proximal and their outer edges placed transversely to the apex; spots 4–6 are less wedge-shaped and are placed nearly parallel with the outer margin, the sixth being nearer the margin; the seventh spot is oblong and closer to the margin than the others, and it is sometimes divided; the last spot is minute and placed below the submedian. Most specimens show some red scales at the end of the cell, forming one or two small spots or one discocellular spot. Basal half of wing at vein 2 powdered with pale yellow scales which are mixed with short dark green hair. *Hind wing* black. Basal half from cell to submedian and distally to vein 3 powdered with pale yellow; this area covered with yellowish-green hair. Base of cellule 7 powdered with yellow, præcostal area and cellule 8 white. Inner margin white, with some yellow scaling near the base. Two thin and curved red lines are placed in cellules 4 and 5 in the submarginal area; a small spot of scattered red scales may be present in cellule 3; all this red scaling may be absent. A few scattered yellow scales may be placed on the margin in cellule 6.

Underside.—Fore wing black, with subapical band orange-red; some yellow scaling along the outer margin, but variable in extent; yellow basal scaling in the cell; inner margin grey-white to vein 1 *a*, but not reaching the end of this vein. *Hind wing* as in the male, the post-discal red band generally more heavily marked. Slight variations occur in the pattern, but these are common to both sexes.

Head black, with yellow hair; palpi black, fringed with yellow and black hair; antennæ black; thorax greenish yellow above, lighter yellow below; abdomen black, powdered with yellow, ventral surface white mixed with yellow.

Length of fore wing, ♂ 32–38, ♀ 31–38 mm.

Hab. Central Ceram, Mount Manusela, 6000 feet, October and November.

The collectors note that "most of the females of this species were taken at 6000 feet, and most of the males at 5000 feet." The males were more difficult to obtain than the females. "On the wing the female is remarkably like the South American *Pereute*."

This striking form of *Delias* is the first known in which the female has a red band on the upperside. It is allied to *negrina*, Fabr., from Australia, and to *dohertyi*, Roths., from Jobi and Biak Islands.

Described from a small series of both sexes.

Delias manuselensis, sp. n. (Pl. XIX. figs. 13–17.)

♂. *Upperside.—Fore wing* white; costa narrowly edged with black, outer margin narrowly bordered with black from apex to vein 3, distal ends of veins 2–7 black. *Hind wing* white.

Underside.—Fore wing white; apex and outer margin broadly dull purplish-bronze to below vein 2, and bearing near the margin a row of six white spots; the anterior two or three spots are tinged with yellow, all are rounded, the upper three being more ovate, the lower spot much smaller than the others; the distal margin of the dark area is invaded by white in cellule 4; costa narrowly purplish bronze; some grey and yellow scaling at the base. *Hind wing* deep purplish-bronze; a submarginal series of six pale yellow spots which are rounded and slightly pointed distally, their points sometimes touching the margin; cellule 8 powdered with yellow; inner margin to the submedian sparsely powdered with yellow; a white discal spot formed of some loosely placed white scales along the outer edge of the lower discocellular.

Head grey-black; palpi black, with black and white hair; antennæ black; thorax black, with grey hair above and below, sides with some yellow hair; abdomen black, powdered with white, especially at sides and on ventral surface, claspers white.

♀. *Upperside.*—*Fore wing* white with blackish-brown apical half; costa narrowly black; base greyish to vein 2 and merging anteriorly into the outer greyish powdering of the apical area; apical area reaching to the submedian and bearing a series of six submarginal white spots, the fourth and fifth the larger, and the sixth smaller; the greyish powdering distally cuts off a white patch outside the end of cell, this patch being indented distally, its lower part forming a tooth in cellule 4. *Hind wing* grey, formed by a thin layer of white scales on a blackish-brown ground; this colouring is darker distally and leaves a more or less extent of black ground-colour in the distal area; a narrow marginal border of grey-white, deeply crenulate on its inner edge.

Underside.—*Fore wing* as above, but dark apical half more sharply defined; base powdered with grey along costa and below the cell, base of cell powdered with yellow. *Hind wing* as in the ♂.

Head and appendages, thorax, and abdomen as in ♂.

Length of fore wing, ♂ 26–29, ♀ 26–31 mm.

Hab. Central Ceram, Mount Manusela, 6000 feet, October and November.

Described from 5 ♂ ♂ and 7 ♀ ♀.

This distinct species appears to be allied to *momea*, Bdv., from Java, and to *nysa*, Fabr., from Australia.

Delias echidna, Hew., ♀. (Pl. XVI. figs. 4, 5.)

The female of this rare species does not appear to have been previously recorded. A specimen has existed for some years in the Joicey Collection, taken by J. C. Kershaw in 1909 and bearing the locality "Amboina."

Upperside.—Fore wing black. An apical row of four white spots in cellules 4–7, the two middle spots larger than the others; basal area extending to vein 3 powdered with grey-white mixed with yellow. *Hind wing* black. Basal area to end of cell and between costa and a short distance from anal angle grey-white, whiter on inner margin.

Underside.—Fore wing black. An apical row of four yellow spots with an additional spot in base of cellule 7, outer edge of this band tinged with white; basal half of cell powdered with yellow, and some grey scaling along base of costa; white scaling along inner margin. *Hind wing* as in ♂, postdiscal black band broader than in ♂ but varying in width; black marginal border a little broader.

Length of fore wing 29–34 mm.

Described from a series obtained in Central Ceram, Mount Manusela, 3000–6000 feet, mostly at 3000 feet, October and November.

Delias duris, Hew.

Delias duris, Hew. Exot. Butt., 1. *Pieris*, no. 34, pl. v. fig. 34 (1861) (Ceram).

This species is subject to some variation, and the so-called seasonable forms referred to by Fruhstorfer in Seitz, Macrolep. ix. p. 128, are merely variations. The extreme form with the red discal area extended to join the submarginal red band is alone worthy of the name *aleria*, Fruh., as an aberration. There is no marked wet and dry season on the Mansuela Range, where this species was obtained in some number during the period of most rain—October and November.

Delias stresemanni, Roths.

Delias stresemanni, Roths. Nov. Zool. xxii. p. 110 (1915) (Central Ceram).

This species is subject to much variation. We have only one ♂ specimen, which agrees with the description of the single ♂ in the Tring Museum in having a "broad cloud-like whitish postmedian band," and even this is indistinct. There is in most of our specimens some yellow scaling on the inner margin of hind wing below. On the upperside the black margins vary slightly in width.

The ♀ exhibits most variation. We have no specimen in which the spots on the fore wing are entirely white, and at least the costal spot is yellow.

Ab. 1.—Upperside with the grey areas almost buff-colour.

Ab. 2.—Hind wing below with a cloudy narrow, white, and curved postdiscal band touching the cell.

Ab. 3.—Hind wing as in 2 but postdiscal band yellow, and some scattered yellow scaling in the cell; extended yellow scaling on the median area.

Ab. 4.—Hind wing as in 3, but with sharply defined yellowish-white band and dark basal area bearing scattered yellow scales.

Ab. 5.—Hind wing as in 4, but with dark yellow basal area.

The ab. 2 belongs to the typical form of ♂ described by Rothschild.

For the form in which the postdiscal band is entirely absent we propose the name *œnus*.

For abs. 3 and 4 we propose the name *mediofasciata*.

For ab. 5 we propose the name *basiflava*.

For ab. 1 we propose the name *lutea*.

Eribœa jupiter, ab. *rectifascia*, ab. nov.

The series of this species collected in Central Ceram do not differ from specimens found in New Guinea, but an interesting aberration seems to deserve a name, as it is possible that in Ceram this species may ultimately form a race.

♂ ♀. The discal band of the hind wing has lost most of the glaucous edging, so that the distal border is straight, and there is at most a few scattered blue scales beyond it.

3 ♂ ♂, 1 ♀, 2500–6000 feet.

Besides the above a series of 12 ♂ ♂ of *jupiter* were obtained by the collectors.

ERIBŒA PYRRHUS, Linn., and its Allied Forms.

The discovery of the *jupiter* form on Ceram is of great interest as previously only *pyrrhus*, L., was known from there, and is recorded by Rothschild (Nov. Zool. vol. xxii. p. 134, 1915) from Manusela at an elevation of 650 m. Ever since the revision of the *Charaxes* group by Rothschild and Jordan in 1898, *jupiter*, Butl., has been treated as a race of *pyrrhus*, L. We have now to consider these as being two distinct species, and this view is further supported by the distribution.

We have examined the forms of the *pyrrhus* group in this new light, and our conclusion is that three species are represented. It must be said that at present no examination has been made of the genitalia, and the position of a few of the forms, which are absent in the Joicey Collection, has been placed according to the description.

We are able to distinguish the three species as follows:—

E. jupiter, Butl.—Fore wing above with black basal area and with well-defined band. Hind wing beneath with the outer edge or discal white band straight. Abdomen black above in both sexes, beneath white in the ♂, black or blackish brown in the ♀. The fringe of hair on inner margin of hind wing blackish brown.

E. sempronius, Fabr.—Fore wing not black in basal area. The hind wing below with the two black discal lines farther apart, the outer one irregular, not curved so much as in *pyrrhus*, and not straight as in *jupiter*. Abdomen white or buff, in the ♀ brown beneath. Thorax not so dark above as in the other species, and but little darker than the abdomen. The fringe of hair on inner margin of hind wing is white.

E. pyrrhus, Linn.—The basal area of the fore wing with glaucous suffusion or entirely creamy- or greyish-white. Basal area of hind wing white or grey. On the hind wing beneath the black line along the outer edge of the reduced white discal band is curved inwards. Abdomen in both sexes mostly buff, dorsum generally darker, in the ♀ blackish beneath. The fringe of hair on inner margin of hind wing is grey-white or dusky.

The following classification of the forms of this group has been prepared in accordance with the preceding diagnoses:—

Eribœa pyrrhus pyrrhus, Linn. Amboina, Ceram.
—— —— *obiensis*, Roths. Obi.
—— —— *gilolensis*, Butl. Gilolo, Batjan.
—— —— *bandanus*, Roths. Banda.
—— —— *buruanus*, Roths. Buru.
—— —— *andrewsi*, Butl. Christmas I.
—— —— *lettianus*, Roths. Letti I.
—— —— *babbericus*, Fruh. Babber I.
—— —— *antigonus*, Fruh. Dammer I.
—— *jupiter jupiter*, Butl. The whole of New Guinea, Bismarck I., New Hanover, Fergusson I., Trobriand I., Vulcan I., Aru I., Ceram.
—— —— *chlorus*, Fruh. Waigeu.
—— —— *glauca*, Joicey & Talb. Biak.
—— —— *attila*, Gr.-Sm. Guadalcanar.
—— —— *editha*, Ribbe. Bougainville.
—— —— *admiralitatis*, Roths. Admiralty I.
—— —— *watubela*, Roths. Kissui I.
—— *sempronius sempronius*, Fabr. Queensland, N.W. Australia, New South Wales, Lord Howe I.
—— —— *seitsi*, Roths. Tenimber.

Eribœa sempronius galaxia, Butl. Timor.
—— —— *jovis*, Stgr. Sumbawa.
—— —— *scipio*, Roths. Sumba.
—— —— *romanus*, Fruh. Roma.
—— —— *aloranus*, Roths. Alor.
—— —— *kalaonicus*, Roths. Kalao.
—— —— *pyrrhulus*, Fruh. Wetter.

With the exception of the typical *jupiter* and *sempronius* the forms of this group are still rare, and some interesting results are to be expected from an exploration of the higher lands in the interior of the large islands.

Since this paper was prepared, another distinctly new *Delias* has been received from Ceram. This will be included in a second paper.

The illustrations accompanying this paper are excellently produced from photographs taken by Mr. H. Campbell, who is in charge of the photographic department of the Hill Museum.

EXPLANATION OF THE PLATES.

Plate XIV.

Fig. 1. *Troides procus*, Roth., ♂.

Plate XV.

Fig. 2. *Troides procus*, Roth., ♀.

Plate XVI.

Fig. 3. *Papilia weiskei stresemanni*, Roth., ♀.
Fig. 4. *Delias echidna*, Hew., ♀. Underside.
Fig. 5. Ditto. Upperside.

Plate XVII.

Fig. 6. *Delias joiceyi*, sp. n., ♂. Upperside.
Fig. 7. Ditto. Underside.
Fig. 8. Ditto, ♀. Upperside.

Plate XVIII.

Fig. 9. *Delias joiceyi*, sp. n., ♀. Underside.
Figs. 10–12. Ditto, ♀. Showing variation.

Plate XIX.

Fig. 13. *Delias manuselensis*, sp. n., ♂. Upperside.
Fig. 14. Ditto. Underside.
Fig. 15. Ditto, ♀. Upperside.
Fig. 16. Ditto. Underside.
Fig. 17. Ditto, ♀. Dark form.

XLIV.—*A new Siamese Nematode of the Genus* Falcaustra.

By H. A. BAYLIS, M.A.

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Falcaustra siamensis, sp. n.

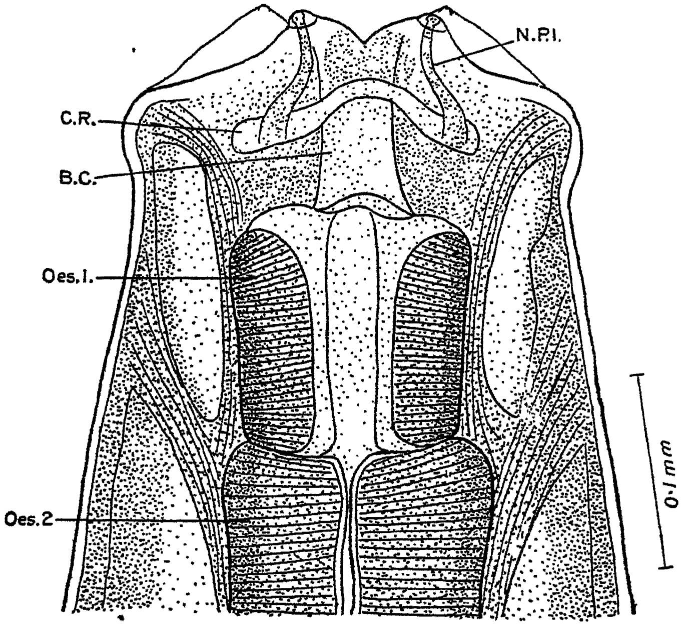
This worm, collected by Dr. Malcolm Smith from the gut of the Siamese freshwater tortoise, *Hieremys* [*Cyclemys*] *annandalei*, and kindly presented by him to the British Museum, shows a remarkable and interesting divergence from the genotype, *F. falcata* (v. Linst.), as redescribed by Lane (1915). This consists in the presence of a series of sucker-like organs on the ventral surface of the caudal region in the male, which will be referred to again later. In *F. falcata* no such organs are present, and this point has been confirmed by a re-examination of Lane's specimens, which are in the British Museum.

The worms (for measurements see table, p. 414) are stoutish in the middle, tapering considerably at each end, and the fixed material shows constantly a slight curvature towards the ventral side at both ends in the female and a strong ventral coiling of the caudal end in the male. The cuticular striation is exceedingly fine. The lateral fields are conspicuous and attain a width of 0·35 mm. The musculature of the body is of the meromyarian type of Schneider.

The head (fig. 1) is somewhat wider at the base than the neck which follows it. The mouth is bounded by three similar lips (figs. 1 and 2), which are somewhat flattened antero-posteriorly, except for two projections on each lip, each projection bearing a rather prominent papilla at its apex. The long nervous pulps of these papillæ show the same bifurcation as in the type-species, but the inner branch is not visible in a lateral view. When, however, the lips are seen from the anterior aspect (fig. 2), the inner branch of each pulp (*N.P.* 2.) is seen to run directly from its origin to the inner border of the lip, where it seems to end in a little secondary papilla. The mouth-cavity is surrounded, at the level of the widest part of the head, by a thick cuticular ring (figs. 1 and 2, *C.R.*), as in *F. falcata*. The bases of the pulps of the cephalic papillæ are seen (fig. 2) to be in close connection with this, passing through six triangular apertures arranged at regular intervals round the outside of the ring.

The œsophagus shows the same parts as in the genotype, differing only in relative proportions. The anterior division (fig. 1, *Oes. 1.*) is slightly longer than broad, and has a thick cuticular lining. The posterior division (fig. 1, *Oes. 2.*), or œsophagus proper, bears an oval swelling just in front of the posterior bulb, the swelling and the bulb together corresponding to the hourglass-shaped third portion of the œsophagus described by Lane for *F. falcata.* There is a considerable dilatation of the intestine at the point where it joins the œsophagus.

Fig. 1.



Falcaustra siamensis. Dorsal view of head and anterior part of œsophageal region.

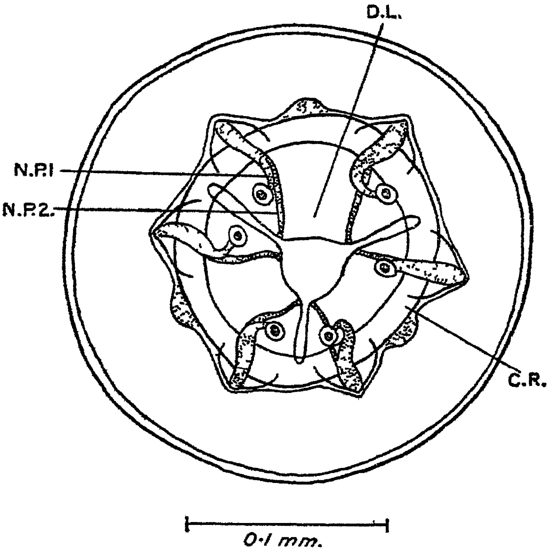
B.C., buccal cavity; *C.R.*, cuticular ring; *N.P. 1.*, outer branch of pulp of papilla; *Oes. 1*, *Oes. 2*, anterior and posterior portions of œsophagus.

The cervical papillæ are very small, but prominent, nipple-like organs, situated at about the middle of the œsophageal region, and therefore at a considerable relative distance from the anterior end. The excretory pore, as in *F. falcata*, is situated near the posterior end of the œsophagus, and has vesicular structures in front of and behind it.

In both sexes the tail is tapering and ends in a fine point.

The caudal end of the male has no alæ. There is a series of oblique muscle-bands on either side, extending forward for some 2·5 mm. in front of the cloaca, and in front of this a row of sucker-like organs on the ventral surface, at regular intervals, with radiating muscle-bands. These organs are fusiform, with the long axis running antero-posteriorly; they are not provided with any chitinoid supporting structure, and are similar to the single preanal sucker of *Subulura* and certain other forms. Of three male examples available, two possessed four of these organs, the third only three. There are ten pairs of rather large caudal papillæ (figs. 3, 4, 5, *1*–*7*, *9*–*11*) and one median double papilla (figs. 3–5, *8*) just in front of the cloacal aperture. Two pairs of postanal papillæ (numbered *3* and *4* in the figures) are laterally situated, the

Fig. 2.

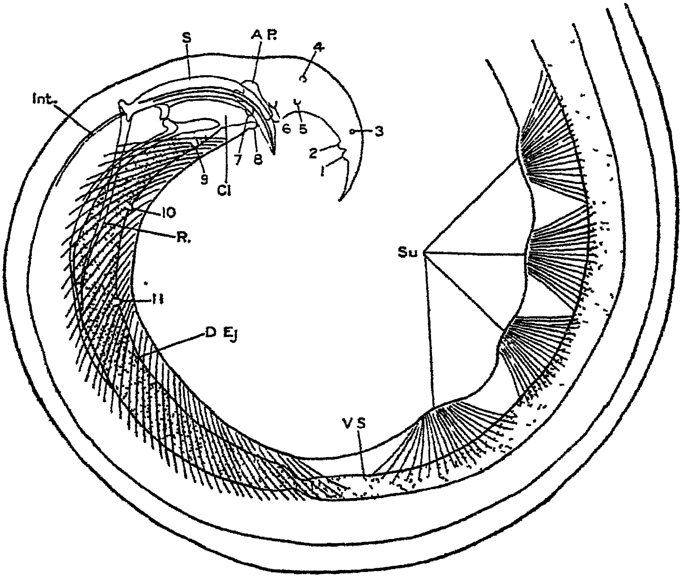


Falcaustra siamensis. The head, seen from its anterior aspect.

D.L., dorsal lip; *N.P. 2.*, inner branch of pulp of papilla. Other lettering as in fig. 1.

rest more ventrally. The spicules (figs. 3–5, *S.*) are equal in length. They are wide dorso-ventrally, sickle-shaped, with a finely striated surface, and each presents much the appearance of having a smaller tubular spicule enclosed within it. There is an accessory piece (figs. 3–5, *A.P.*), granular in appearance, and with a median projection which lies between the spicules near the cloacal opening.

Fig. 3.

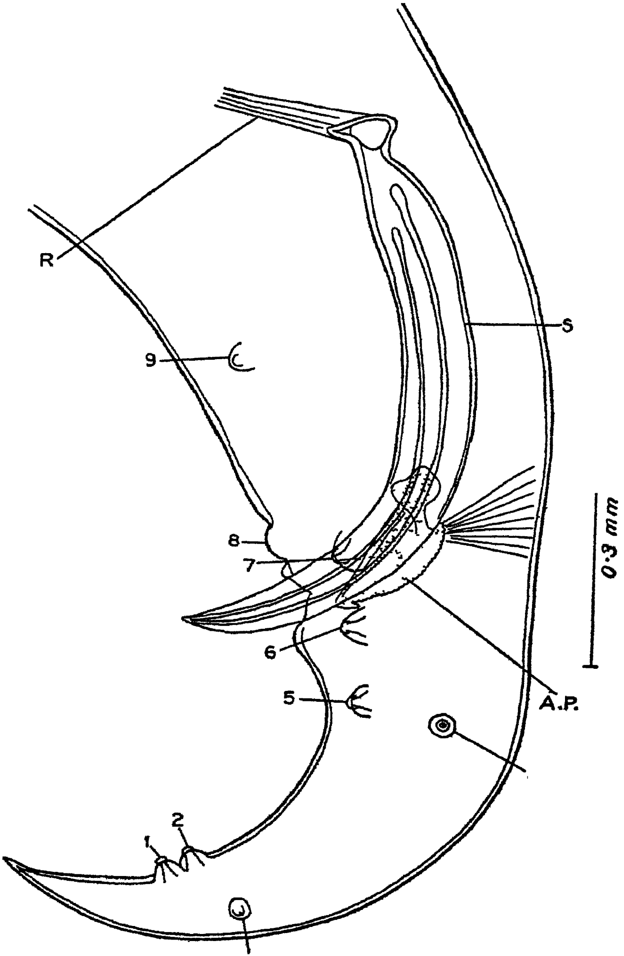


Falcaustra siamensis. Caudal end of male, lateral view.

A.P., accessory piece; *Cl.*, cloaca; *D.Ej.*, ejaculatory duct; *Int.*, intestine; *R.*, retractor muscle of spicule; *S.*, left spicule; *Su.*, sucker-like organs; *V.S.*, vesicula seminalis; *1–11*, papillæ.

The female genital organs are similar in arrangement to those of *F. falcata.* The vagina runs forward and dorsally for a distance of about 2 mm. from the vulva, gradually expanding into a thick-walled muscular chamber with a maximum diameter of 0·45 mm. It then gives off two opposed uteri. The anterior uterus runs forward to a point about 3 mm. from the junction of œsophagus and intestine, then doubles back again, and, running back to nearly the level of the vulva, again doubles forward. The posterior

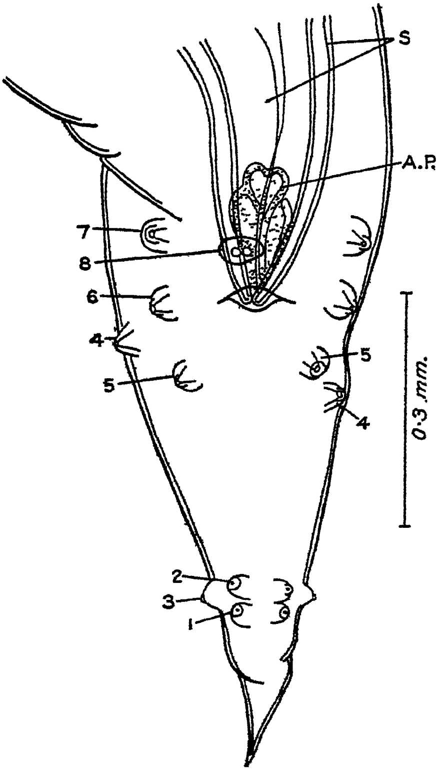
Fig. 4.



Falcaustra siamensis. Tail of male, lateral view.
Lettering as in fig. 3.

uterus runs straight back from its origin to about 4 mm. from the posterior end of the worm, then in a similar way doubles and runs forward, bending back once more at about the level of the vulva. The folds of the ovary corresponding to the anterior uterus appear to lie entirely in front of the vulva, forming a conspicuous loop at the anterior limit, about 1·4 mm. behind the œsophagus. The ovary corresponding to the posterior uterus runs forward and also makes an anterior loop at about the same level as the other, then runs straight back to terminate in the posterior region of the body.

Fig. 5.



Falcaustra siamensis. Tail of male, ventral view.

Lettering as in fig. 3.

The ova are large, oblong-oval in shape, with a thick shell marked externally with a fine granular pattern. They are apparently laid when the contents have not advanced beyond the two-cell stage of segmentation.

Table of Measurements of F. siamensis.
(All measurements in millimetres.)

	♂.	♀.
Length	15·9	16·6
Thickness (maximum)	0·8	0·8
Length of tail	0·9	1·4
,, mouth-cavity	0·1	0·1
,, anterior portion of œsophagus.	0·11	0·13
,, prebulbar swelling	0·27	0·3
Œsophageal bulb, length	0·3	0·35
,, ,, transverse diameter	0·32	0·37
Distance from anterior end to end of œsophagus (including bulb)	2·4	2·6
Distance from anterior end to nerve-ring.	0·6	0·6
,, ,, ,, cervical papillæ	1·32	1·5
Spicules, length	0·86	..
,, breadth	0·09	..
Accessory piece, length	0·21	..
Distance from tip of tail to vulva	..	6·0
,, ,, ,, caudal papillæ (♀)	..	1·0
Size of ova	0·165×0·1075	

A generic diagnosis, based on the characters of the two known species, may now be given:—

FALCAUSTRA, Lane, 1915.

Ascaroidea [? Oxyuridæ]. Meromyarian. Mouth with three equal lips, each bearing two prominent papillæ, the pulp of each papilla giving off an inner branch which probably ends in a small sensory papilla on the inner surface of the lip. Mouth-cavity surrounded by a ring of thickened cuticle. Œsophagus divided into a short anterior and a long posterior portion, both muscular, the latter ending in a well-marked bulb, which is preceded by an oval swelling. Excretory pore towards posterior end of œsophagus. Tail in both sexes tapering and pointed. Caudal end of male with ten pairs of papillæ and a median preanal papilla (double in *F. siamensis*). A series of simple, fusiform, muscular, preanal sucker-like organs may be present. Spicules equal, sickle-shaped, each having the appearance of a spicule within a spicule. An accessory piece present. Vulva towards posterior third of body. Vagina runs forward and gives off two opposed uteri, each of which doubles upon itself in a number of longitudinally-disposed U-shaped loops in the anterior or posterior region of the body respectively. Ova large, thick-shelled, with contents only beginning to segment when laid.

Hab. Gut of Chelonia.

Genotype: *F.* [*Oxysoma*] *falcata* (v. Linst., 1906), from *Geoemyda* [*Nicoria*] *trijuga*.

Note on the Systematic Position of Falcaustra.

At first sight it would not seem unnatural to include the species just described in the subfamily Subulurinæ of the family Heterakidæ, on the ground of the presence of preanal suckers, without chitinoid ring, in the male. But the meromyarian musculature, the position and character of the excretory pore, the structure of the œsophagus with its two bulbous expansions posteriorly, and the fact that suckers do not occur in the genotype render this classification improbable.

Railliet and Henry (1916, *a*) are inclined to place *Falcaustra* among the Oxyuridæ, and they have pointed out (1914, p. 674, footnote) that a sucker occurs in certain meromyarian forms, such as "*Oxysomatium*" *lepturum* (Rud.), from *Chelone mydas*. The presence of a preanal sucker or suckers, therefore, is not a certain indication of Heterakid affinities, and it should be noted that in the present case it is clearly not even of generic value, since one species possesses suckers, while the other does not.

The family Oxyuridæ, at present, stands in need of more precise definition, and, if *Falcaustra* be assigned to this family provisionally, it should be clearly understood that this leaves it in a quite unstable position, and means little more than that it is not referable to the Heterakidæ, as at present defined.

The further question arises whether *Falcaustra* should not be grouped with *Kathlania*, Lane, 1914 (= *Oxysoma* of Schneider, 1866, in part), a genus occurring in turtles, and possessing, like the Subulurinæ, a preanal sucker in the males. Lane (1914) proposed this genus as the type of a subfamily Kathlaniinæ, which is practically identical with the Subulurinæ of Travassos, 1914, of the Heterakidæ. Barreto (1919) excludes *Kathlania* from the Subulurinæ*, and points out that its position among the Heterakidæ would depend upon the type of its subcuticular musculature, which has not been described. An examination of the original specimens of the genotype, *K. kathlena*, Lane, 1914, shows that the musculature is of the same type (meromyarian) as in *Falcaustra*. It would seem justifiable, therefore, to remove *Kathlania*, as Barreto suggests, to the Oxyuridæ, and further, in consideration of the presence of a sucker and other points of resemblance, to assign it to a position near *Falcaustra*, pending a more satisfactory classification of the entire family.

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* There appears to be a discrepancy on this point between the original and the English translation of Barreto's paper, owing to the omission of a negative in the latter. The sense of the original is here followed.

It is not impossible that one of the species of *Kathlania* may be identical with *Oxysoma lepturum* (Rud.), referred to above as "*Oxysomatium*." This is a question which requires careful further consideration, but since Railliet and Henry (1916, *b*) have determined that this and the remaining species of "*Oxysomatium*" cannot be included in the same genus as the genotype, and since the name *Oxysoma* is preoccupied, it seems that the name *Kathlania*, at all events, must be retained.

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XLV.—*Preliminary Description of a new Warthog.*

By Lord ROTHSCHILD, F.R.S., Ph.D.

Phacochœrus barkeri, sp. n.

There is only the front portion of the skull preserved of this animal, but it has such striking characters that it ought to receive a name.

♂ adult. Nasals very broad, quite flat and depressed, whereas in the known species they are strongly convex. Level of top of nasals below that of top of socket of canine tusks, whereas in other species it is considerably above.

Canine tusks comparatively short, but enormously thick and strongly bent forward.

Hab. S.W. of Bahr el Ghazal.

Major Barker, who brought the specimen home, said the animal was quite as large as *Hylochœrus*, but with very small feet.

XLVI.—*On small Mammals from the Famatina Chain, North-western Rioja.* By OLDFIELD THOMAS.

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DURING March and April, after obtaining the collection from Tinogasta of which a list was recently given, Sr. Budin made an excursion to the chain of high hills known as the Sierra Famatina, in the north-western part of Rioja. The chain runs nearly due north and south, approximately on 68° W., and extending from about 28° 20′ to 29° 30′ S.

Sr. Budin collected mostly at a place called La Invernada, in the northern half of the chain, about 35 km. north of the mountain "Nevada de Famatina," and situated at an altitude of about 3800 m. A few specimens (numbers above 989) were obtained lower down and further south, at Potrerillo, alt. 1600 m.

As has happened with several of the collections, the Muridæ have proved to belong to known and more or less widely spread forms, while the Octodontidæ and Chinchillidæ have peculiar local specializations which involve their being described as new. Thus the present collection contains new forms of *Abrocoma*, *Lagidium*, and *Ctenomys*, all distinct from their nearest known allies. On the other hand, no species of Muridæ new to the Museum are in the collection, the one now described as new having been represented here, erroneously determined, for many years.

1. *Phyllotis ricardulus*, Thos.

♂. 908, 911, 913, 924, 931, 933, 936, 937, 940, 942, 975, 977, 978, 1006, 1011; ♀. 915, 917, 918, 939, 949, 955, 958, 962, 965, 973, 979, 980, 989. La Invernada and Potrerillo.

2. *Graomys cachinus*, All.

♂. 996, 1000, 1001. All from Potrerillo.

3. *Akodon glaucinus*, Thos.

♂. 995; ♀. 1014. Potrerillo.

4. *Akodon alterus*, Thos.

♂. 900, 905, 910, 920, 938, 969, 985, 986, 998, 1003, 1004; ♀. 903, 907, 922, 923, 925, 929, 941, 945, 954, 957, 966, 970, 971, 974, 976, 982, 983, 997, 1007, 1008, 1010. La Invernada and Potrerillo.

5. *Akodon gossei*, sp. n.

♂. 916, 919, 921, 930, 934, 935, 943, 944, 947, 948, 950, 952, 959, 967, 988 ; ♀. 909, 926, 927, 968. La Invernada.

A small species of a pale pinkish colour, very like a pale *Evotomys*.

Size decidedly less than in the last species, the teeth in particular very much smaller. Fur rather thin, hairs of back 8–9 mm. in length. General colour above greyish, washed on back with cinnamon or buffy of various intensity ; the head, nape, and sides more greyish. Under surface washed with pale buffy, the bases of the hairs slaty. Ears greyish or buffy, darker on the proectote, more whitish on the proximal part of the metentote, which is darker terminally ; a whitish or buffy patch on the side of the head behind their bases ; these whitish marks on and behind the ears form an obvious characteristic of the species. Hands and feet white or buffy white. Tail about as long as the body without the head, brown or buffy brown above, whitish or pale buffy below.

Skull of normal shape. Supraorbital edges squared. Palatal foramina reaching to the level of the first third of m^1. Bullæ fairly large.

Dimensions :—

Of the type : head and body 92 mm. ; hind foot 19.

Of the largest of Sr. Budin's specimens, measured in the flesh : head and body 96 ; tail 66 ; hind foot 19 ; ear 13.

Skull (type) : greatest length 24 ; condylo-incisive length 22 ; zygomatic breadth 12·5 ; nasals 8·4 ; interorbital breadth 4·2 ; breadth of brain-case 11·7 ; palatilar length 10 ; palatal foramina 5·2 ; upper molar series 3·8.

Hab. (of type). Puente del Inca, Andes of Mendoza. Alt. 10,000′.

Type. Adult, but not old, female. B.M. no. 98. 3. 21. 5. Original number 3. Collected January 1897 by Philip Gosse. Presented by E. A. Fitzgerald. Three specimens from the type-locality, two from Las Vacas, in the same district, alt. 2500 m. (*P. O. Simons*), one from "Chili" (*Philippi*), and the present series examined.

This species has long been known to me, but under the name of *andinus*, Phil., for there is a young specimen of it in the small collection, received, as I believe, from Dr. Philippi himself, with the name of "*Mus andinus*" upon it, a determination I had hitherto accepted.

But on looking up Dr. Philippi's two descriptions and figure of his *M. andinus* *, I find that that is evidently quite a different animal, for it has elongated claws, a purely grey—not rufous or buffy—colour, and is decidedly larger, the hind foot measuring 23 mm., while in the largest of the considerable series of *gossei* now available this measurement is only 21 mm., and is generally less. Nor do light ear-patches appear to be present.

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* Arch. f. Nat. 1858, i. p. 77 ; An. Mus. Nac. Chile, xiv., Zool. Murideos Chile, p. 22, pl. vi. fig. 2 (1900).

I therefore now describe the reddish species as new, and have particular pleasure in connecting with it the name of its captor, now Capt. Philip Gosse, late of the R.A.M.C., to whom in recent years we have been indebted both for a series of the small mammals of the war-front at Armentières and also for a number of interesting Poona and Nilgiri mammals.

Akodon gossei is readily distinguishable from most species of *Akodon* by its warm *Evotomys*-like colour and the whitish patches on and round its ears. It is, however, somewhat similar to the *A. jucundus* of Jujuy, but has markedly larger teeth.

6. *Abrocoma famatina*, sp. n.

♂. 951, 956, 960; ♀. 972, 981. La Invernada.

"Lives under rocks and in their clefts and fissures."—*E. B.*

Rather smaller than the other species; tail shorter than in *A. budini*, longer than in *cinerea*. General colour ashy grey, much as in *cinerea*, but one specimen is more drabby, about as in the type of *budini*; in any case, however, the colour-range in the genus is very slight and of but little importance. Under surface paler grey, the tips of the hairs white or pale drabby; throat darker drabby; a well-marked whitish sternal gland present in all the specimens, male and female. Ears rather smaller than in other species; flesh-coloured basally, blackish terminally. Hands and feet white, the latter of normal length, not specially shortened as in *A. cinerea*[*].

Skull smaller and with shorter muzzle than in *A. budini* and *cinerea*, the distance from the tip of the incisors to the alveolus of p^4 about 13·8 mm. as compared with about 15·3 in the other two. Nasals slender, narrowed behind, but not so markedly so as in *budini*. Plane of jugals almost as much slanted as in *budini*. Posterior palatal foramina as in the other Argentine species. Bullæ about as in *cinerea*, rather larger than in *budini*. Cheek-teeth of medium size, smaller than in *budini*.

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[*] The feet of the type of *A. cinerea* were measured by Sr. Budin and published by me as 27·5 mm. in length, but this is certainly longer than they really are. In the dry state they now measure 24·6 mm., and would not have exceeded 25 mm. when fresh. Comment was made on the peculiar shortness of the feet, a comment which would have been unjustified had they measured 27 mm.

Dimensions of the type:—

Head and body 182 mm.; tail 117; hind foot 29·5; ear 23·2.

Skull: greatest length 45; condylo-incisive length 42·2; zygomatic breadth 23·6; bimeatal breadth 24; nasals 16·5; interorbital breadth 7·4; palatilar length 20; diastema 13; length of bulla on a line parallel with the median axis of the skull 15; upper tooth-series, crowns 9·3, alveoli 10. Incisors smaller and more delicate than in *budini*, about as in *cinerea*.

Hab. Famatina Range, Rioja. Type from La Invernada, 3800 m.

Type. Adult male. B.M. no. 20. 8. 4. 46. Original number 960. Collected 19th March, 1920.

This Famatina Abrocoma is probably most nearly allied to *A. budini* of Otro Cerro, Catamarca, but is smaller, with shorter muzzle and shorter tail. *A. cinerea* of Casabindo, Jujuy, has a still shorter tail and shorter feet, and the muzzle is as long as in *budini*. All these Argentine species, from the eastern slope of the Cordilleras, have the posterior palatal foramina minute, while in the two species of the western—Chilian—side these foramina are fused into a comparatively large single opening.

Sr. Budin has been peculiarly successful in obtaining these rare and interesting animals, this being the third he has discovered out of the five species known.

7. *Ctenomys famosus*, sp. n.

♂. 946, 992, 993, 994, 1013; ♀. 914, 953, 990, 999, 1002. La Invernada and Potrerillo.

Like *C. coludo*, but tail shorter and bullæ smaller.

Size about as in *coludo*, or perhaps a little smaller, but differences of age make exact size-comparison difficult. Colour quite as in that animal. Tail decidedly shorter, the longest of the series only attaining 73 and 74 mm., while in our eight specimens of *coludo* all adults have the tail over 80 mm., while the longest attain 95 and 97.

Skull very much as in *coludo*, but smaller. Bullæ decidedly smaller, though still larger than in the larger species *C. knighti* of Otro Cerro. Zygomata less widely expanded mesially. Supraorbital region with small ledges. Teeth rather less heavy than in *coludo*.

Dimensions of the type:—

Head and body 160 mm.; tail 74; hind foot 31·5.

Skull: median length 41; condylo-incisive length 40·5; zygomatic breadth 24·5; nasals 14·3; interorbital breadth 8·5; bimeatal breadth 26·7; palatilar length 17·3; upper tooth-series, crowns 8·2; diameter of p^4 3·1.

Hab. (of type). Portrerillo, at about 2600 m. Other specimens from La Invernada, 3800 m., both in the Famatina chain.

Type. Adult female. B.M. no. 20. 8. 4. 54. Original number 229. Collected 8th April, 1920.

As is natural, this Famatina tucu-tucu is nearly allied to the *C. coludo* of Tinogasta, Catamarca, just to the north, but its tail is uniformly shorter and its bullæ smaller, so that it would seem to need a special name.

8. *Lagidium famatinæ*, sp. n.

♀. 961, 984, 987, and three separate skulls. La Invernada.

"Shot at an altitude of 3800 to 4000 m."—*E. B.*

Near *L. lockwoodi*. Larger and less suffused with yellowish.

Size rather larger than in *lockwoodi*, the skull about 95 to 98 mm. in greatest length, as compared with 85 to 90 in that species. General colour above, of unbleached fur, bluish grey, nearest to "neutral grey" of Ridgway, without the brownish suffusion found in *lockwoodi*. Under surface broadly washed with buffy or ochraceous; white axillary patches present in all three skins.

Skull larger than that of *lockwoodi*, and differing from it in various details, of which the following are the most tangible. Muzzle distinctly longer, the diastema about 29 mm. in all six skulls, as compared with 26 in five of *lockwoodi*. Premaxillæ not so broadened, the incisors not being so thick. Lacrymal bones broadly developed, of irregular shape, their antero-posterior approaching their transverse diameter; in *lockwoodi* they form hardly more than a narrow fringe to the front edge of the orbit. Posterior part of skull higher owing to the greater height of the bullæ and meatus—in *famatinæ* the height from the lowest point of the bulla to the highest on the suprameatal island is about 30 mm., in *lockwoodi* 27 mm.; occipital shield differently shaped, its upright edges nearly parallel, the nearest points at the upper corners of the mastoids about 22 mm. from one another—in *lockwoodi* the shield is narrow above, broadening below, the above measurement about 17–18 mm. Bullæ more swollen than in *lockwoodi*.

Incisors averaging lighter in colour, white in four of the six skulls, yellowish in the other two; in *lockwoodi* all are strong yellow. Molars not appreciably different.

Dimensions of the type:—

Head and body 390 mm.; tail 376; hind foot 109; ear 82.

Skull: greatest length 96; condylo-incisive length 89; zygomatic breadth 46; nasals 35 × 12·5; upper molar series (alveoli) 21·5.

Hab. as above.

Type. Adult female. B.M. no. 20. 8. 4. 57. Original number 984. Collected 30th March, 1920.

This mountain chinchilla, although very like *L. lockwoodi*, differs from it by so many details that it evidently needs description as new. In making the comparison I have had available five examples of *lockwoodi* and six of *famatinæ*, and the differences, such as they are, are perfectly uniform throughout the series.

The three skins are all in changing pelage, the new winter fur—grey—coming up among the old faded summer coat, which is of a dull drab-colour. Neither winter nor summer fur agrees in colour with that of *lockwoodi*, of which our available specimens are in fresh summer coat.

9. *Galea comes*, Thos.

♂. 912, 928; ♀. 932, 963. La Invernada.

10. *Marmosa elegans pallidior*, Thos.

♂. 964, 991, 1005, 1012; ♀. 1009. La Invernada and Potrerillo.

XLVII.—*On Mammals from Ceram.*

By Oldfield Thomas.

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The British Museum has received a collection of small mammals—mostly rodents—obtained by Messrs. Charles, Felix, and Joseph Pratt in the island of Ceram while engaged on a zoological exploration of the Dutch East Indian Islands. The majority of the specimens were collected at an altitude of about 6000′ on Mount Manusela, the high mountain in the centre of the island.

Although a certain number of specimens from the coast-regions of Ceram had been previously obtained, no collections have hitherto been formed from the central mountain region, and it is therefore not surprising that I found the present series of remarkable interest, for no less than seven species out of twelve are new to science, and include one—the local bandicoot—which needs distinction as a special genus. A second species of peculiar interest is the tree-rat—*Uromys fulgens*—which appears to mimic in colour the bright shoulder-mantle of the large fruit-bats which inhabit the island.

So far as I am aware, no notice on the mammals of Ceram has hitherto been published, while our only previous collection from there is a series of 108 specimens which were obtained in 1909 by the late Mr. W. Stalker. But these were almost all bats of widely-spread species, and having been collected at Wabaii, on the coast, give no indication of the faunistic peculiarity shown by the central highlands.

The present series is therefore of very great zoogeographical interest.

1. *Nyctimene cephalotes*, Pall.

♂. 37. Teloeti Bay.
Previously obtained in Ceram by Mr. Stalker.

2. *Hipposideros diadema*, Geoff.

♀. 33. Teloeti Bay.

3. *Rhinolophus* sp.

♂. 32. Teloeti Bay, S. Ceram.

4. *Rattus feliceus*, sp. n.

♂. 5, 14; ♀. 9, 29, 34. Mt. Manusela. 6000′.
"Trapped in thick jungle."

A large spinous-haired species with 2—2=8 mammæ and a short, nearly naked, scaly tail.

Size large, much larger than in *R. mordax*, about as in *ratticolor*. Fur long, profusely mixed with spines, both hairs and spines on back about 20 mm. in length, and the latter about 0·5 in breadth. General colour above deep rich rufous-brown, grizzled with blackish, the hairs slaty with rich rufous tips; the longer bristle-hairs on the posterior back with buffy tips. Sides clearer rufous. Under surface white, not very sharply defined laterally, the hairs white to their bases. Head browner and less rufous than back. Ears comparatively short, blackish brown. Hands and feet very thinly haired, flesh-coloured, the fine hairs whitish. Tail not as long as the body without the head, almost naked, the scales very large (about six rings to the cm.), uniformly pale brown. Mammæ 2—2=8, as in *R. mordax*, not 1—2=6, as in *R. leucopus* *, *ringens*, and *ratticolor*.

Skull about as large as in *R. ratticolor*. Zygomata well thrown out anteriorly. Supraorbital beads well developed, passing backwards to the middle of the parietals, but not forming postorbital processes. Palatine foramina large and well open, their hinder edge level with the front root of m^1. Choanal opening broad, some way behind molars. Bullæ of medium size. Incisors somewhat opisthodont, index about 65°. Molars as usual.

Dimensions of the type:—

Head and body 210 mm.; tail 172; hind foot 45; ear 22.

Skull: greatest length 51 (in an older male 54·7); condylo-incisive length 48; zygomatic breadth 24; nasals 20·5; interorbital breadth 7·2; breadth of brain-case 19·5; palatilar length 25·5; palatal foramina 9·5; breadth of choanæ 4·6; upper molar series 8·5.

Hab. as above.

Type. Adult female. B.M. no. 20. 7. 26. 7. Original number 29. Collected February 1920.

This rat is easily distinguishable by its much greater size, reddish colour, and white belly from *M. mordax*, which alone of this group of Papuan species has its mammary formula.

The name of Mr. Felix Pratt, one of the members of the expedition, is remembered in the name given to this fine species.

5. *Rattus manuselæ*, sp. n.

♂. 1, 2, 3, 15, 20; ♀. 11, 19. Mt. Manusela. 4000′.
♀ in formalin. 6000′.

"Trapped in heavy jungle."

A mountain representative of the widely spread *R. rufescens* group.

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* At a time when the genus *Rattus* was called *Mus*, Alston (P. Z. S. 1879, p. 646) rightly renamed Gray's *Acanthomys leucopus*, on the ground that, being a member of "*Mus*," the specific name was preoccupied by the American *Mus leucopus*, a species of *Peromyscus*.

But now that the genus bears the name *Rattus*—and, of course, the *Peromyscus* never had that name applied to it—Gray's name should apparently be reinstated, and the Queensland species long known as "*Mus terræ-reginæ*, Alst.," be called *Rattus leucopus*, Gray. The female specimen, no. 67. 5. 6. 4, may be selected as its lectotype.

Size about as in *rufescens*. Fur thick, hairs of back about 15 mm. in length. General colour above rufescent brown, the head greyer. Under surface soiled greyish white, occasionally washed with yellowish, the hairs broadly slaty at base. Ears brown. Hands and feet whitish. Tail little or not longer than head and body, dark brown, little hairy. Mammæ 2—3=10 or 3—3=12.

Skull as compared with specimens of the same group from Wabaii in the lowlands, collected by W. Stalker, of about the same size, the nasals longer and more attenuated, supra-orbital ridges lighter, and more broad outwards on the parietals; choanal openings wider; projection forward of zygomatic plate less. Molars comparatively small and light.

Dimensions of the type:—

Head and body 160 mm.; tail 165; hind foot 37; ear 22.

Skull: greatest length 42; condylo-incisive length 39; zygomatic breadth 20; nasals 16·6; interorbital breadth 6·3; breadth between ridges on parietals 15·7; palatilar length 19·6; palatal foramina 7·9; breadth of choanæ 3·4; upper molar series 7.

Hab. as above.

Type. Adult male. B.M. no. 20. 7. 26. 13. Original number 20. Collected December 1919.

A member of the common widely spread *Rattus rattus* or *Rattus rufescens* group. Two specimens of the same group obtained by Mr. Stalker in the lowlands of Ceram have much shorter or coarser fur, more whitish underside, and in the skull are distinguishable by the details above mentioned. Apparently, therefore, the Manusela rat is a modified mountain form which may be given a special name.

6. *Rattus* sp.—*R. concolor* group.

♂. 27. Mt. Manusela. 4600′.

♂ in formalin. 6000′.

The local member of the small widely spread Oriental and Australasian group to which *R. concolor, browni, maorium, exulans*, and others belong. Characterized by small size and 2—2=8 mammæ. Not determinable more exactly at present.

7. *Stenomys ceramicus*, sp. n.

♂. 13, 16; ♀. 30. Mt. Manusela. 6000′.

"Trapped in heavy jungle."

Smaller than *S. verecundus*, larger than *S. niobe* and *klossi*. Palate unusually produced backwards.

General external appearance almost precisely similar to that of *S. niobe* and *klossi*. Fur similarly soft (hairs of back about 14–15 mm.). Colour equally dark and finely speckled, most nearly matching "olive-brown" of Ridgway. Under surface scarcely lighter; the tips of the hairs dull drabby. Ears short, blackish. Hands and feet dark brown; feet not so markedly slender as in the older known species. Tail about the length of the head and body, nearly naked, dark brown.

Skull in general shape like that of *S. verecundus*, with the same smooth slender muzzle and slight supraorbital beading. Palatal foramina small, far in front of the molars, their anterior third peculiarly narrowed. Posterior palate unusually produced backwards, almost suggesting this part in some of the smaller fruit-bats, such as *Cynopterus*, the mesopterygoid fossa broad and low, the lateral fossæ very shallow, and the entopterygoid processes very slender. Bullæ larger than in other species.

Incisors with the same flattening and suspicion of grooving found in *S. niobe*, but not in *S. verecundus*. Molars small, their structure as in the other species.

Dimensions of the type:—

Head and body 135 mm.; tail 140; hind foot 30; ear 18.

Skull: greatest length 38; condylo-incisive length 34·8; zygomatic breadth 16·6; nasals 15 × 4·2; interorbital breadth 5·7; breadth of brain-case 15; palatilar length 19·7; palatal foramina 6; postforaminal palate 11·1; breadth of choanæ 3·2. Upper molar series 6·2.

Hab. as above.

Type. Adult male. B.M. no. 20. 7. 26. 28. Original number 13. Collected January 1920.

This species, while superficially very like *S. niobe* and *klossi* of New Guinea, is really widely distinct, its elongated palate and larger bullæ indicating a very essential difference.

8. *Uromys fulgens*, sp. n.

♂. 31, 35. Teloeti Bay. Sea-level.

"Caught in a tree near sea-coast."

A long-tailed and remarkably brightly coloured ochraceous species.

Size about as in the majority of the smaller species of the genus. Fur fine and velvety, hairs of back about 10 mm. in length, the few fine longer bristle-hairs about 18. General colour above uniform bright "ochraceous-orange," perhaps the brightest found in Muridæ; bristle-hairs blackish, too few to affect the general bright colour. Under surface sharply defined white, the hairs white to their roots. Whiskers very abundant, blackish. Eyelids dark brown. Ears short, a quite inconspicuous whitish patch behind their bases. Hands whitish, metacarpals slightly browner. Feet with buffy metatarsus and white digits. Tail very long, much longer than in other species; naked, finely scaled, pale brown.

Skull shorter, broader and higher than in most species, but with all the essential characters of the genus *Uromys*. Supra-orbital ridges well-developed, small postorbital processes present below the ridges at the hinder edge of the orbit. Zygomata evenly and widely convex outwards. Palatal foramina quite short, as usual in the genus, thus contrasting with the other two Ceram species. Palate ending behind further forwards than usual, opposite the front edge of m^3.

Molars strictly as in normal *Uromys*.

Dimensions of the type:—

Head and body 150 mm.; tail 200; hind foot 34; ear 19.

Skull: greatest length 40; condylo-incisive length 37·5; zygomatic breadth 22·7; nasals 13; interorbital breadth 7; breadth of brain-case 16·5; height of crown from alveolus of m^2 12·7; palatilar length 17·2; palatal foramina 5·7; upper molar series 7·1 (7·6 in a second specimen with less worn teeth).

Hab. Coast of Ceram, at Teloeti Bay. Sea-level.

Type. Old male. B.M. no. 20. 7. 26. 20. Original number 35. Collected February 1920.

This brightly coloured animal stands out in startling contrast to the other animals of the collection, these being all dull-coloured and more or less "saturate" forms. No doubt most of them are from the heavy jungles of Mt. Manusela, while this is a coast animal; but I am disposed to believe that a second factor here comes into play. Inhabiting trees which would no doubt be commonly filled with fruit-bats of the genus *Pteropus*, whose bright yellowish mantles are of nearly the same colour as the *Uromys*, it would appear very probable that the latter really mimics the former, the rat gaining protection by its resemblance to the fruit-bats, which hawks generally leave severely alone. Cases of true mimicry are exceedingly rare among mammals, so that, if this supposition be correct, *Uromys fulgens* is an exceptionally interesting animal.

The unusually long tail of this species is no doubt correlated with its arboreal life.

9. *Uromys ærosus*, sp. n.

♂. 6, 22; ♀. 4, 26, 28. Mount Manusela. 4000–6000′.

A middle-sized very dark-coloured species.

Size about as in the larger ordinary members of *Uromys*, exclusive of the giant species, *e. g.*, as in *bruijnii*, *moncktoni*, &c. Fur close and fine, hairs of back about 13 mm. in length. General colour above dark coppery brown (rather warmer than "mummy-brown"), somewhat variable in tone, often becoming rusty on the rump. Under surface scarcely lighter, the hairs dark slaty for three-fourths their length. Hands and feet brown, a few lighter hairs on the wrists. Tail shorter than head and body, naked, scaly, blackish brown.

Skull of normal shape, not specially broadened. Supraorbital edges sharply square, and in one case with a tendency to overhanging ledges. Palatal foramina rather long for this genus, nearly approaching the level of the front root of m^1. Hinder edge of palate level with the middle of m^3. Molars unusually large in proportion to the size of the animal, contrasting markedly with those of the other Ceram species in this respect.

Dimensions of the type:—

Head and body 150 mm.; tail 138; hind foot 31; ear 18.

Skull: greatest length 38; condylo-incisive length 35; zygomatic breadth 19; nasals 14·3; interorbital breadth 5·7; breadth of brain-case 15·8; height of crown from base of m^2 10·5; palatilar length 16·5; palatal foramina 6·5; upper molar series 7·8.

Hab. as above.

Type. Adult female. B.M. no. 20. 7. 26. 24. Original number 26. Collected February 1920.

This species is distinguished from any of the Papuan forms by its dark colour, longer palatal foramina, and proportionally heavy teeth. A young specimen of it was collected on Mt. Manusela in 1911 by Mr. E. Stresemann, and was presented by him to the British Museum.

10. *Uromys fraterculus*, sp. n.

♂. 10, 23. Mt. Manusela. 6000′.

"In thick jungle."

Size small. Fur long and thick, hairs of back nearly 15 mm. in length. General colour above as in the great mass of the Papuan species, a dull rufous, greyer on the head, richer on the rump. Under surface soiled buffy, the hairs slaty with buffy tips. Ears short, pale brown. Hands and feet pale brownish with white digits. Tail proportionally long, less completely naked than usual, its minute hairs comparatively evident; irregularly mottled pale brown and white in the type, and in the paratype white for its whole length below.

Skull of normal proportions, in size and general build not unlike that of *U. gracilis*, though the brain-case is more swollen. Interorbital region narrow. Palatal foramina very long for this genus, reaching practically to the level of the front edge of m^1. Hinder edge of palate level with the middle of m^3. Molars small, narrow.

Dimensions of the type:—

Head and body 115 mm.; tail 155; hind foot 26; ear 18.

Skull: greatest length 33; condylo-incisive length 31; zygomatic breadth 16·4; nasals 12·5; interorbital breadth 4·8; breadth of brain-case 14; height from crown to alveolus of m^2 8·6; palatilar length 14·6; palatal foramina 6·3; post-foraminal palate 6·4; breadth of choanæ 2·5; upper molar series 6·6.

Hab. as above.

Type. Adult male. B.M. no. 20. 7. 26. 26. Original number 10. Collected January 1920.

Although looking very like some of the smaller Papuan species, this Ceram *Uromys* is readily distinguishable by its long palatal foramina and elongated tail. *U. obiensis*, the only species found to the westward of Ceram, has wholly white belly-hairs and a black tail; but that also has comparatively long palatal foramina.

11. *Phalanger orientalis*, Pall.

♂. 8. Mt. Manusela. 5000′.
♀. 36 (young). Teloeti Bay.

Judging from accounts given to Messrs. Pratt by their native hunters, it seems probable that a species of *Dactylopsila* is also found in Ceram.

12. *Rhynchomeles prattorum*, gen. et sp. n.

♂. 7. 21, 24; ♀. 12, 17, 18, 25. Mt. Manusela. 6000′.

"Trapped in heavy jungle in limestone formation. Country very precipitous. Native name 'Mabaya.'"

RHYNCHOMELES*, gen. nov.

Fur completely non-spinous. Upper incisors 4. Teeth very small.

Most nearly related to *Echymipera* and *Peroryctes*, agreeing with the former in the number of incisors and with the latter in the even more completely non-spinous character of the fur. Ears short. Proportions of feet and strength of claws as in *Echymipera*. Tail neither so short as in *Echymipera* nor so long as in *Peroryctes*.

Skull extraordinarily long and slender, the muzzle especially being quite unique in this respect. Other skull-characters about as in *Echymipera*.

Incisors $\frac{4}{3}$. Teeth all very small and delicate, widely spaced owing to the elongation of the muzzle; sectorial (p^3) more robust in build than the other teeth. Molars more triangular, owing to the hypocone being nearly obsolete instead of well-marked. Last molar especially small, its inner lobe much reduced, so that it does not reach inwards to the level of the inner lobes of the three anterior molariform teeth; in the older known genera it projects further inwards than they do.

Genotype. *Rhynchomeles prattorum*, sp. n.

With the incisive formula of *Echymipera*, this genus has even more completely spineless fur than *Peroryctes*, while the proportions of its claws and feet are more as in the former. It is unique in its excessively slender muzzle and reduced teeth, and evidently deserves a special genus of its own.

Rhynchomeles prattorum, sp. n.

Fur crisp, velvety, not spinous; hairs of back about 14 mm. in length. General colour above a uniform dark chocolate-brown, rather otter-like, not closely matching any colour in Ridgway; bases of the hairs whitish brown. Under surface practically the same or a little lighter—a strongly contrasted white patch of very variable size on the chest. Muzzle naked both on top and sides. Ears small, oval, brown. Head and forearms rather lighter than back, a white patch sometimes present on the wrist. Upper surface of hands nearly naked, the few fine hairs whitish. Feet pale brown. Tail rather less than twice the length of head, practically naked, blackish brown.

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* As has been done in the case of *Brachymeles* and *Anuromeles*, the word *meles* is here taken as an essential part of the name *Perameles*, not as the Latin for badger.

Skull and teeth as described above.

Dimensions of the type:—

Head and body 320 mm.; tail 130; hind foot 65; ear 25.

Skull: greatest length 84·5; condylo-basal length 81; zygomatic breadth 27; nasals, length 37, breadth at middle 3·4, breadth behind 5; breadth of muzzle at p^1 6·5; interorbital breadth 15·3; intertemporal breadth 14; palatal length 52; palatine foramina 9·3; posterior palatine vacuities 7·5; front of canine to back of m^3 35, three anterior molariform teeth 10·5; transverse diameter of m^3 2·6.

Hab. as above.

Type. Adult male. B.M. no. 20. 7. 26. 34. Original number 21. Collected February 1920.

This mountain bandicoot is a very striking and interesting animal, widely different from any previously known form. It is at once recognizable by its crisp but not spinous fur and its extraordinarily long slender muzzle. I have much pleasure in connecting with it the name of the Pratt brothers, whose expedition has resulted in its discovery.

XLVIII.—*A remarkable new Genus of Lamellicorn Beetles.*

By Gilbert J. Arrow, F.Z.S., F.E.S.

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The exceedingly remarkable little beetle here described was found in September 1897 by the French missionary, Father Cardon, at Chota Nagpore, in Bengal, and has lately been sent to me for investigation by M. René Oberthür. It was probably found in a termite nest, the curious termitophilous *Chætopisthes fulvus*, Westw., having been taken at the same time. While exhibiting certain characteristics of both the Coprinæ and Aphodiinæ, it is impossible to refer it to either, and it appears inevitable to regard it as the type of a new subfamily (to be called Aphodiocoprinæ). Although its general conformation and especially the widely separated middle coxæ appear to indicate the Coprinæ, the fact that the interval between the coxæ is formed by the mesosternum and not the metasternum, the double spurs to the hind tibia, the corneous mandibles and strange mouth-structure exclude it from that group. The mouth-structure, as well as the distant middle coxæ, equally excludes it from the Aphodiinæ.

APHODIOCOPRIS, gen. nov.

Corpus solidum. Pedes validi, tarsis anticis gracilibus, 4 posterioribus gracilibus, valde contractis et latis. Caput latum, oculis nullis. Antennæ breves, 9-articulatæ, articulis 3–6 brevissimis, clava magna, triphylla. Os a mento toto obtectum. Coxæ anticæ contiguæ, prosterno medio obsoleto; coxæ intermediæ paulo obliquæ, latæ separatæ, mesosterni medio latitudine fere ad longitudinem æquali. Metasternum breve, haud antice productum, sutura recta a mesosterno separatum. Coxæ posticæ latæ contiguæ. Femora omnia permagna. Tibiæ omnes latæ, apice recte truncatæ, anticæ extus acute bidentatæ, absque calcare, posteriores 4 bicalcarati, intermediæ longiora, postice ante apicem minute dentatæ. Ungues simplices. Mandibula glabra, cornea, apice haud acuta. Maxilla brevis, intus pectinata, palpo gracili. Labium quadratum, absque ligula aut palpis.

Aphodiocopris minutus, sp. n.

Rufo-piceus, totus glaber, supra fuscus, opacus, corpore duplo longiori quam latiori, alte convexo, medio paulo constricto, capite lato, supra obtuse tuberculato, antice regulariter arcuato; pronoto antice lato, medio fossulato, costis 5 longitudinalibus, quarum mediana brevi antica, lateralibus utrinque retrorsum convergentibus, instructo, parte basali medio profunde canaliculato, extus oblique striato; elytris brevibus, longitudine ad pronoti longitudinem æqualibus, convexis, postice dilatatis, fortiter rotundatis, costis validis 7, prima suturali medio bifida, reliquis medio fortiter flexis, omnibus costulis transversis parum perspicuis internexis, humeris antice productis, acutis.

Long. 1·5 mm.; lat. max. ·75 mm.

Hab. Bengal (Chota Nagpore): Nowatoli (*Cardon*).

This extraordinary little insect, probably the smallest Lamellicorn beetle hitherto discovered, seems to have no near relationship with any other insect. It is of extremely solid and compact build, the prothorax evidently capable of little or no separate movement, and the remarkable legs, of which the front pair are stout, with long and slender tarsi, the middle pair long, but with extremely contracted tarsi, and the hind pair short, with the tarsi still more abbreviated, evidently indicating a very sluggish and peculiar gait.

The head is broad and has an obtuse elevation upon the vertex. The front margin of the clypeus is evenly rounded and fits closely against the anterior femora and the front angles of the prothorax, the large antennal club then occupying a cavity formed by the hollowed-out lateral angles of head and thorax. Eyes are completely absent and the labium is destitute of palpi and ligula, the mentum forming a quadrate plate covering the mouth. The terminal lobe of the maxilla forms a comb composed of five or six long stout spines, and the palpus is well developed and slender. The mandibles are completely corneous, with a cutting-edge, and blunt at the tip. The prothorax is much broader in front than at its base, where it is closely embraced by the shoulders of the elytra, and the latter organs are very short (about equal in length to the pronotum), narrow at the base and broad behind the middle. They are highly convex, but from their form are evidently fused and immovable, the wings being lost or useless. The pronotum has a deep cavity in the middle, produced in the form of a groove to the base, a short median longitudinal ridge in front of it and two long ones on each side, the inner pair parallel and the outer pair diverging to the front angles. The remaining surfaco is also ridged, but more finely. The elytra bear seven longitudinal ridges, in addition to the inner and outer marginal ones, the first of the seven produced by the division of the inner marginal costa, the other six arising at the base, where they are longitudinal, and strongly bent outwards about the middle. There are feebler transverse ridges between these costæ, most apparent in the wide interstice between the first and second discoidal costæ. The legs are very stout, the femora thick and hollowed above to receive the tibiæ, which are very broad and flat, the front ones truncate at the extremity, with two lateral teeth, the middle ones considerably longer than the rest and having a minute tooth at the posterior edge a little before the end. The front tarsi are slender and normal, the four posterior ones extremely short and broad, and the two basal joints imperfectly separated. There are two spurs to each of the four posterior tibiæ, but none are visible upon the front legs. Upon the posterior legs the inner one is short and straight and the outer one more than twice as long (little shorter than the hind tarsus), strongly curved and acuminate. The front and hind coxæ are contiguous, the middle ones separated by a wide interval occupied, not, as in the Coprinæ, by the anterior part of the metasternum, but by the mesosternum, which is twice the length of the metasternum and divided from it by a straight suture. There are six ventral segments visible beneath. The female has the front tibia broader than the male and its extremity obtuse internally, while in the latter it is sharply toothed.

The structure of the sternum is wholly anomalous and entirely different from that found either in tho Aphodiinæ or Coprinæ, although simulating that of the latter. In most other important features the insect is like the Aphodiinæ, especially in the occurrence of two spurs to the hind tibia. The incapacity for flight, the absence of eyes, and the remarkable specialization of the four posterior feet are features quite peculiar to the genus, and no doubt all are related to myrmecophilous or termitophilous habits. In certain respects there is a marked resemblance to *Chætopisthes*, the almost equally anomalous genus in whose company it was apparently taken by Father Cardon. In the organs of the mouth, the atrophy of the labium, and the spinose maxilla the likeness is striking, but the entirely different structure of the legs and sternum seems to prove that the similarities are due to a similar manner of life rather than a real relationship. In *Chætopisthes* the eyes are very well developed, the legs and tarsi long, the middle coxæ contiguous, and there is only a single spur to the hind tibia, as in the Coprinæ. A series of specimens of *Chætopisthes* taken by Cardon in the same locality (and probably in the same nests) as the new form show that *C. wasmanni*, Schm., is the male of *C. fulvus*, Westw., the peculiar hair-fringes being characteristic of the female and the thoracic lobes of the male.

XLIX.—*A peculiar new Genus of Australian Beetles.* By Gilbert J. Arrow, F.Z.S., F.E.S.

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In forwarding, through Dr. Marshall, of the Imperial Bureau of Entomology, a collection of insects from North Queensland, Dr. Illingworth has recorded for the first time a remarkable habit in certain species related to the great genus *Onthophagus*. Two species were found by him attached to the fur of wallabies, and evidently awaiting the droppings which form the food of most of the group. Specimens were even found within the cloaca. That this was no exceptional occurrence is shown by the adaptive modification of the feet in both species. In *Onthophagus* the last joint and the claws are exceedingly slender, and the latter feeble and quite simple in form; but in these wallaby-borne species this joint of the foot forms a strong grasping apparatus, and its enlargement makes the insects easily recognizable. Five species are known to me which share this peculiarity, and are also alike in their general form and in the absence of horns or other sexual armature. All of them seem to be confined to

Northern Australia. They evidently form a natural group, which I propose to call

MACROPOCOPRIS, gen. nov.

Corpus compactum. Caput et thorax inermes. Tarsorum omnium articulus ultimus magnus, conicus. Ungues validi, fortiter flexi, basi lobati. Scutellum invisibile. Cetera ut in genere *Onthophago.*

The characteristic claw-structure is very peculiar. The claw-joint is enlarged and conical, with its broad end distal and its lower edge produced in the form of a strong blunt spine between the claws. The claw is very long and doubled upon itself so that the basal part forms a strong lobe, separated only by a narrow space from the reflexed terminal part. A leaf-like scale sharply pointed at the end flanks each claw externally. There is only a single pair of long terminal setæ at the upper edge of the claw-joint, and the pulvillus, usually represented by a pair of setæ at the base of the claws beneath, is absent. This arrangement evidently enables the beetle to cling to the hair of the wallaby, which would be impossible for *Onthophagus*, with its quite simple and gently curved claws.

In his synopsis of the Australian species of *Onthophagus* (Trans. Roy. Soc. S. Australia, xxvii. 1903, p. 265), Blackburn has included two species of *Macropocopris* in his Group IV., in which the pronotum is "pseudo-margined" (viz., *kingi*, Har., and *parvus*, Blackb.), and three in Group VI., in which it is without a basal margin (*inermis*, Macl., *muticus*, Macl., and *submuticus*, Blackb.), while *O. carmodensis*, Blackb., subsequently described, falls into his Group V. I believe his *O. muticus* and *submuticus* to be really identical with *O. kingi* and *parvus* respectively, and *inermis*, Macl., to be the female of the latter. The supposed difference in the prothoracic margin is illusory. The pseudomargin is present in all, but is invisible when the pronotum and elytra are in close contact, being overlapped by the base of the elytra.

Blackburn has remarked, in his revision of the Australian Onthophagi just referred to, that he knew of no external feature by which the sexes could be determined positively in all cases. D'Orbigny, who devoted many years to the study of the same vast genus, made the same confession. But a careful examination of the shape of the last ventral segment will enable this to be done without difficulty. In the female this segment is of nearly equal breadth throughout, whilst in the male it is always considerably narrowed in the middle. This applies equally to the species of the new genus. The type of *O. carmodensis*, Blackb., a species the sex of which Blackburn was unable to decide, is a female, but the male is practically identical with it, except for a rather stronger curvature of the front tibiæ. The more dilated prothorax, by which he has distinguished *O. submuticus* from *inermis*, Macl., is also a peculiarity of the male.

The known species of the new genus may be tabulated as follows:—

A.	Clypeus rounded or lightly emarginate.	
B.	Upper surface very smooth.	
C.	Metasternum strongly punctured	*parvus*, Blackburn.
c.	Metasternum unpunctured.	
D.	Short	*kingi*, Har.
d.	Elongate	*prehensilis*, sp. n.
b.	Upper surface strongly punctured	*symbioticus*, sp. n.
a.	Clypeus bidentate	*carmodensis*, Blackb.

Macropocopris prehensilis, sp. n.

Niger, subopacus, tarsis rufis clavaque antennali flava; elongato-ovalis, convexus, capite absque carina, clypeo transverse rugoso, margine rotundato, fronte lævissime punctato; pronoto fere lævi, antice et lateraliter subtilissime punctato, haud lato, lateribus arcuatis, haud angulatis aut sinuatis, angulis anticis haud acutis, basi supra haud marginato, medio obtuse angulato; elytris subtiliter striatis, striis haud punctatis, interstitiis vix perspicue punctulatis; pygidio subtiliter punctato; corpore subtus lævi, subnitido, metasterno impunctato.

Long. 10·5 mm.; lat. max. 6·5 mm.

Hab. N. Queensland: Kuranda (Nov.—*G. E. Bryant*).

A single male specimen was found.

M. prehensilis is a large species, slightly larger than any other known, and distinctly more elongate. It is quite black but not shining above and very smooth above and beneath, almost without hair, except upon the legs, with the metasternum quite devoid of punctures. The head is without carinæ (in the male), the clypeus strongly rounded in front and transversely wrinkled above, the forehead very lightly punctured and the eyes fairly large and very smooth. The pronotum is very convex, scarcely perceptibly punctured, with the sides strongly rounded but not angulated, the front angles rather blunt and the hind angles indicated. The elytra are also very convex, very finely and lightly striated, with scarcely perceptible puncturation in the intervals. The pygidium is exceedingly feebly and sparsely punctured.

The tarsi are fairly slender, and the claws scarcely enlarged but of the characteristic form.

Macropocopris symbioticus, sp. n.

Æneo-niger, pedibus rufis antennisque flavis; parvus, breviter ovatus, nitidus, corpore supra toto fortiter punctato, extus breviter setoso, capite ubique fere æqualiter punctato, clypeo medio leviter emarginato, a fronte carina recta valde elevata separato, fronte carina lævi instructo, oculis fortiter granulatis: pronoto fortiter sat crebre punctato, lateraliter parce setoso, margine basali supra haud visibili; elytris profunde striatis, striis fortiter punctatis, interstitiis minutius irregulariter punctatis, lateraliter parce setosis; pygidio fortiter punctato; tibia antica calcare arcuato, postica calcare recto, apice bifido, armatis.

Long. 4–5 mm.; lat. max. 3 mm.

Hab. N. Queensland: Cairns (July).

About fifty specimens, all taken upon wallabies, have been sent by Dr. Illingworth.

This species differs from all the previously described forms by its smaller size, the much stronger puncturation of its upper surface, the fine setæ at the sides of the pronotum and elytra, distinctly emarginate but not notched clypeus, the slight posterior carina in addition to the strong anterior one, coarsely granulated eyes, and the bifid spur to the hind tibia. It is black with a metallic tinge above, the legs and clypeus red (and generally also the front margin of the pronotum), and the antennæ yellow. In some specimens an irregular red spot is visible near the posterior margin of the elytra, and occasionally one appears upon the shoulder also. The two sexes are practically identical in external characters, but the male has the spur of the front tibia more strongly bent than the female.

L.—*A new Genus of Clavicorn Beetles.*
By Gilbert J. Arrow, F.Z.S., F.E.S.

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The curious little insect here described has been sent to me for identification by Professor R. Thaxter, of Harvard University, as the carrier of a parasitic fungus, *Dimeromyces ametrothecalis*, Thaxter. The two specimens, which are all at present known of the genus, were found in West Africa, and from its form and affinities there is no doubt that the insect lives under the bark of trees and preys upon other insects. It is very distinct generically from any other insect hitherto known, although it has evident affinities with several distinct types of Cucujidæ. In the shape of the head, the very small size of the eyes, and especially in the reduction of the first tarsal joint, it shows the closest approach to *Cucujus*, the impressed lines on the head and thorax are like those so characteristic of *Læmophlœus*, and the abbreviated elytra as obviously indicate relationship with *Inopeplus*. The differences from all three genera are still more striking, however, than the resemblances. The structure of the tarsi is very different from that found in *Apytho* and *Pseudino*.

CUCUJINUS, gen. nov.

Corpus deplanatum, oblongum. Caput magnum, postice latissimum, postice et lateraliter stria submarginali profunde incisum. Oculi minuti, prominentes. Clypeus brevis, leviter emarginatus. Labrum exsertum, semicirculare. Mandibulæ prominentes, extus leviter arcuatæ, apice obtuse bifidæ. Antennæ moniliformes, articulis primo et ultimo modice elongatis. Pronotum breve, latum, linea sublaterali, postice paulo abbreviata, incisa. Elytra abdomen haud tegentia, postice paulo attenuata. Prosternum latum, haud productum. Coxæ 4 anteriores late distantæ. Femora omnia lata. Tarsi 4 anteriores 4-articulati, postici 3-articulati.

Cucujinus micromma, sp. n.

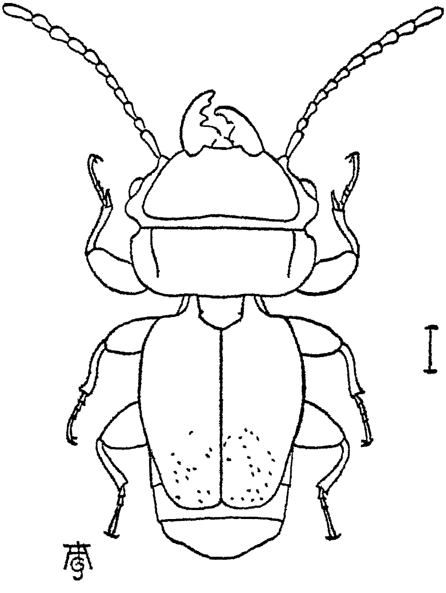
Testaceus, elytrorum dimidio postico vage infuscato; valde depressus, nitidus, ubique minute inæqualiter punctulatus, capite post oculos latissimo, pronoto valde transverso, angulis anticis paulo emarginatis, posticis toto obsoletis; elytris quam capitem et prothoracem paulo longioribus, sed abdominem haud tegentibus, partim subtilissime striatis, postice paulo attenuatis.

Long. (mandibulis exclusis) 4–5·5 mm.; lat. max. 2 mm.

Hab. W. Africa: Cameroon.

The rather indefinite dark posterior patch is probably due in part to the transparency of the elytra revealing the wings beneath, and may not be a constant feature. The two specimens described are males, and it may be expected that in the female the head and prothorax will prove to be of less exaggerated size and the hind tarsi four-jointed.

It is an extremely flat-bodied insect, oblong and loosely jointed, with stout legs and prominent mandibles, the head very large and forming (in the male) the widest part of the body. The eyes are very small, prominent and hemispherical, and placed at the sides of the head, which is dilated behind them, so that their position is oblique. There is a straight incised line at the back of the head, continued forward on each side as far as the base of the antenna. The antennæ are more than half the length of the body, and consist of eleven loosely-articulated joints, all a little elongate, but especially the first and last. They are attached midway



Cucujinus micromma, sp. n.

between the eye and the base of the mandible. The mandibles are large and prominent, rounded externally and bluntly bifid at the tip, with two or three blunt internal teeth. The clypeus is broad and slightly emarginate in front, the labrum semicircular and closely fringed at the edge. The terminal joints of all the palpi are fusiform and elongate. The pronotum is nearly three times as wide as it is long and slightly wider than the widest part of the elytra. The front and hind margins are nearly straight, the sides strongly and regularly curved, completely obliterating the hind angles. The front angles are rather minutely excised. There is a slightly sinuous lateral stria on each side, extending from the front margin to near the base. The scutellum is broad, rounded and not angulated behind. The elytra are nearly half as long again as their width in combination, feebly dilated at the sides from the shoulder to the middle, and thence narrowed to the extremities, which are separately rounded. The last segment of the abdomen and parts of the two preceding ones are exposed dorsally. The sternal sutures are straight, the coxæ of the front and middle legs small, globular and widely separated, and the hind coxæ transverse but rather far apart. The femora are very thick, the hindmost pair in particular being very broad in the middle. The tibiæ are short and each bears two terminal spurs beneàth, very short and inconspicuous except the upper one of the front tibia, which is rather long and stout. There are in reality five joints to each of the four anterior tarsi and four to the hind ones, but the basal joint is so extremely short as to be invisible from above. All the joints are simple and the second, or apparent basal joint, is short and scarcely longer than the succeeding one.

BIBLIOGRAPHICAL NOTICE.

Catalogue of the Lepidoptera Phalænæ. Supplement, Vol. II. By Sir GEORGE HAMPSON, Bart. Pp. xxiii & 619, pls. xlii.–lxxi. London: printed by Order of the Trustees of the British Museum. 1920.

THIS Volume forms a Supplement to Vol. III. of the 'Lepidoptera Phalænæ,' issued in 1901, and its publication has been much delayed by the European War. The two families dealt with are the Lithosiadæ (Arctianæ) and the Phalænoididæ (=Agaristidæ olim). 32 genera and 1295 species are added, making the totals for these groups 232 and 2365 respectively, the supplement to the Arctianæ alone adding 1215 species to the original 845, showing the great amount of work that has been done since 1901; no new forms, however, are described in the present volume. This is the last of the series to be published during the author's term of office at the Museum. he having retired therefrom on March 20th last. But we believe the text of three more volumes was finished before he left, and these may eventually be published by the Trustees of that institution when sufficient funds are available for the purpose. The supplementary Vol. I., issued in 1914–15, was briefly noticed in this Magazine, (8) xix. p. 291 (March 1917). The MSS. of present volume, it should be stated, was completed early in 1915, and no references to German or Austrian publications which have appeared since August 1914 are given, few of which could have been received in time to be included.

THE ANNALS

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[NINTH SERIES.]

No. 35. NOVEMBER 1920.

LI.—*On the Oriental Members of the Coleopterous Group Macrodactylides* (Melolonthidæ). By GILBERT J. ARROW, F.Z.S., F.E.S.

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IN his classification of the Melolonthidæ ('Genera des Coléoptères,' vol. iii.) Lacordaire noted as a remarkable fact that an Indian insect, *Dejeania alsiosia*, Bl., was the sole known non-American representative of the great Sub-tribe Macrodactylides. In the Ann. & Mag. for 1907 (ser. 7, vol. xix. p. 436), I announced that *Dichelomorpha ochracea*, placed by Burmeister in the Hoplides, was really congeneric with *Dejeania*, and that the latter name having been preoccupied must be replaced by *Dichelomorpha*. I also referred to this genus a species (*D. marginata*, Nonfr.) wrongly described as a *Hoplia*. The number of described species allied to these is now fairly considerable, but they have been generally misplaced, so that the utmost confusion still prevails amongst them.

Dichelomorpha ochracea, described by Burmeister in 1855, was again described by Boheman in 1858 as a species of *Dichelus* (*chinensis*, Boh.), and in 1900 Fairmaire transferred it under that name to yet another genus, which he named *Sinochelus*, adding two more species, which also belong to *Dichelomorpha*. In 1881 Sharp described a species from

Sumatra (*D. crassa*, Sharp) and placed it in another Hopliine genus, *Dichelhoplia*, and Fairmaire in 1898 followed him by adding a species from Tonkin to that genus (*D. fuscopicta*). Dalla Torre's recent Catalogue of the Melolonthinæ, while naturally omitting these errant forms, has collected nine in all under the name *Dichelomorpha*, but two of these (the "*Plectris*" *punctuligera* and *glabrilinea* of Walker) have certainly no connection with it. I have referred to these in my paper on the "Melolonthine Beetles of Ceylon" (Ann. & Mag. Nat. Hist. (8) xviii. 1916, p. 130).

But this does not exhaust the errors of which these insects have been the victims, for a genus, *Diphycerus*, formed by Fairmaire for two species from China and placed by him in still another section of the Melolonthinæ, proves upon examination to be closely related to *Dichelomorpha*. Of this genus I have here described three additional species and a third Oriental genus is also characterized.

The genus *Dichelomorpha* will certainly prove to comprise very numerous forms. A few of those contained in the British Museum are here named and described. It is possible that others than those I have mentioned may have been wrongly ascribed to other genera, but I have appended a list of all at present known to me. These insects have in common a number of peculiar features, chief of which are the mobile but symmetrical claws, those of the front feet generally differing a little from the rest, and the remarkable interlocking of the pronotum and scutellum, the base of the former being notched on each side, sometimes deeply and sometimes only minutely, to receive the anterior angles of the scutellum, which is sometimes also notched in the middle to receive a median process of the pronotum. *Diphycerus* differs from *Dichelomorpha* in having this interlocking mechanism much more strongly developed, as well as in its very sharp and slender claws, which are cleft upon the front feet alone.

A marked characteristic of the group is the great disparity between the sexes. The females have sometimes little resemblance to the males and are generally less numerous. In the male the legs are generally very stout, the abdomen short and hollowed beneath, with the ventral segments free and the pygidium rather long and narrow. In the female the legs are comparatively slight and feeble, the abdomen is large, rotund and rigid, and the pygidium short and broad. In some species of *Dichelomorpha* the 5th ventral segment is enormously enlarged in the female and the pygidium proportionally reduced, so that the ventral orifice becomes actually dorsal in position.

Although so generally confused with the Hoplides these insects are quite distinct. They are closely related to the South American genus *Ceraspis*, which also exhibits most of their characteristic features. They are distinguished from the Hoplides by the possession of six exposed ventral segments, symmetrical claws, and the normal complement of tibial spurs—that is, one upon each front tibia and two upon each of the others.

The Oriental species of the group known to me are :—

DICHELOMORPHA, Burm.

Syn. *Dejeania*, Blanch., *Sinochelus*, Fairm.

alsiosa, Blanch. (*Dejeania*).	India.
arcana, sp. n.	Borneo.
assamensis, sp. n.	Assam.
borneensis, Brenske (*Dejeania*).	Borneo.
brenskei, Nonfr. (*Dejeania*).	Siam.
cinctipennis, Fairm. (*Sinochelus*).	Tonkin.
crassa, Sharp (*Dichelhoplia*).	Sumatra.
delauneyi, Fleut. (*Dejeania*).	Annam.
felina, sp. n.	Annam.
fuscopicta, Fairm. (*Dichelhoplia*).	Tonkin.
limbata, Fairm. (*Sinochelus*).	E. China.
lineata, Arrow (*Dejeania*).	Burma.
marginata, Nonfr. (*Hoplia*).	Burma.
multicolor, sp. n.	Indo-China.
nigra, Brenske (*Dejeania*).	Borneo.
nitidicollis, sp. n.	Indo-China.
ochracea, Burm. (*Dichelomorpha*).	S. China.
chinensis, Boh. (*Dichelus*).	
pallida, sp. n.	Malay Peninsula.
pulchella, sp. n.	Tonkin.
rufipennis, sp. n.	Tenasserim.
uniformis, sp. n.	Indo-China.

DIPHYCERUS, Fairm.

alcedo, sp. n.	Sikkim.
davidis, Fairm.	E. China.
jucundus, sp. n.	Tibet.
reitteri, Sem.	China.
tonkinensis, sp. n.	Tonkin.

XENOCERASPIS, gen. nov.

dispar, sp. n.	Sikkim.

Dichelomorpha assamensis, sp. n.

Fusco-brunnea, opaca, supra ubique coriaceo-rugosa, setis brunneis et griseis dense vestita, capito, pronoto partim, scutello, elytrorumque sutura et lineis tribus longitudinalibus setis pallidis ornatis; modice elongata, capite brevi, clypeo lato, margine arcuato, reflexo, pronoto longitudine parum latiori, lateribus medio angulatis, antice et postice fere rectis, valde contractis; elytris 4-costatis, lateribus pone humeros leviter dilatatis, deinde paulo contractis, apicibus haud penicillatis; pygidio corporeque subtus ubique dense et æqualiter griseo-pubescentibus; tibia antica fortiter bidentata; antennis tarsisque sat gracilibus, unguibus minute fissis:

♂, brunnea, elytris griseo-lineatis:

♀, grisea, elytris brunneo-lineatis.

Long. 11–14 mm.; lat. max. 5–7 mm.

ASSAM: Silhet, Chandkhira.

There are six males in the British Museum, and the Brussels Museum contains a single female. It is the largest species of the genus known to me.

The upper surface is very densely clothed with velvety pubescence, but a small patch near the base of the pronotum on each side may be partly or entirely denuded. In the male the brown pubescence predominates and there is a pattern of yellowish-grey setæ, which form five small patches at the base of the pronotum and clothe the scutellum, the elytral suture, and the three discoidal costæ upon each elytron. In the female the grey setæ predominate, covering the pronotum (except for two or three partially denuded areas on each side), the scutellum, and the elytra, with the exception of four dark stripes on each.

The abdomen of the male is strongly arched, the pygidium narrow, and the claws are very minutely cleft. In the female the abdomen is moderately convex, the pygidium broad, the legs are very short, and the claws are less deeply cleft. The antennæ are rather long and slender in both sexes.

D. assamensis resembles *D. alsiosia*, Bl., but is darker in colour and has much more conspicuous markings. The clypeus is deeply excavated, but less deeply than in *D. alsiosia*, the pronotum is more convex, its sides less sharply angulated in the middle, straight and not sinuated from the angle to the base, and the hind angle very obtuse.

Dichelomorpha multicolor, sp. n.

♂. Brunnea, supra densissime squamosa, subtus cum pedibus sat dense et longe flavo-pubescens; elongata, convexa, opaca, capite brevi, dense flavo-setoso, margine fortiter reflexo, arcuato; pronoto distincte transverso, densissime punctato et minute brunneo-setuloso, antice et lateraliter setis luteis, postice medio setis albidis majoribus ornato, lateribus fortiter arcuatis, angulis anticis fere obsoletis, posticis obtusis; scutello dense albido-squamoso; elytris dense brunneo-squamosis, marginis suturalis dimidio posteriori maculaque irregulari mediana albo-squamosis, lineis 2 vel 3 externalibus, basi, medio et apice confusis, pallide fulvis ornatis, sutura ante extremitatem utrinque fulvo-penicillata, lateribus paulo ante medium dilatatis; pygidio dense pallide flavo-setoso; tibia antica valde bidentata, antennis tarsisque gracilibus, unguibus minute fissis.

Long. 12 mm.; lat. max. 6 mm.

INDO-CHINA: Upper Mekong R., Vieng Vai (*R. Vitalis de Salvaza*, May).

I have seen only a single male. It is evidently allied to and not unlike *D. delaunayi*, Fleut., but the elytral pattern is more complicated, consisting of elongate scales or setæ of three different colours, brown, yellow, and white, in addition to which those clothing the head and the front and side margins of the pronotum are of a much richer yellow hue and the disc of the pronotum, except a small triangular white mark in front of the scutellum, is nearly black. The scutellum is white, as well as the posterior half of the elytral suture, dilating at the anterior end into an irregular transverse median patch. The general surface of the elytra is chocolate-brown, but the front and hind margins are buff-coloured and are connected upon the outer half by longitudinal streaks of the same colour, which become confused in the middle. Just before the end of the elytral suture there is a rather long tuft of golden hairs. The pygidium is clothed with rather close-lying buff-coloured setæ and the legs and lower surface bear long coarse hairs of the same colour.

Dichelomorpha pulchella, sp. n.

♂. Brunnea, supra densissime squamosa, subtus cum pedibus ubique sat longe pubescens, capite prothoracisque marginibus (basi excepto) flavis, hujus disco fere nigro, macula basali grisea, scutello griseo, elytris brunneis, basi fasciaque postmediana per suturam continuata et cum basi internexa griseis; elongata, convexa, opaca, capite rugoso, margine rotundato, leviter reflexo; pronoto densissime punctato sed haud dense setoso, pilis longis interspersis instructo, lateribus antice et postice valde contractis, vix arcuatis; elytrorum lateribus ante medium leviter dilatatis, sutura ante apicem longe flavo-penicillata; pygidio coriaceo-punctato, modice dense fulvo-setoso, pilis longis erectis interspersis, apice subnudo; tibia antica valde bidentata; antennis tarsisque gracilibus, unguibus minute fissis.

Long. 8·5–9·5 mm.; lat. max. 4·5 mm.

TONKIN: Dap Kan (*R. Vitalis de Salvaza*, April).

I have seen only male specimens.

Chocolate-brown, the head clothed with orange-coloured setæ, the pronotum nearly black, bordered in front and at the sides with similar orange setæ, the elytra decorated with irregular grey basal and median patches united by a narrow longitudinal stripe on each side and also extending along the suture. The scutellum and a small patch just in front of it are of the same shade.

This species has a very close resemblance to *D. multicolor*, but is rather smaller, the scales of the upper surface are of less contrasted colours, and the lateral and hind margins of the elytra are dark. The clypeus is rather longer and more rugose, and its front margin is less strongly reflexed. The pronotum is more strongly contracted behind, and its disc bears fairly numerous long erect hairs set at nearly equal distances amongst the minute setæ. The elytra are less strongly dilated near the middle of the lateral margins. The pygidium is less finely and closely clothed and is rather longer, narrower, and more vertical.

Dichelomorpha felina, sp. n.

♂. Brunnea, supra densissime squamosa, subtus cum pedibus ubique sat longe pubescens, capite prothoracisque marginibus et linea mediana (hac basi grisea) flavidis, disco utrinque nigro, scutello elytrorumque linea suturali postica, secunda a basi fere ad marginem tertiaque a medio ad apicem pertinentibus, duabus basalibus brevibus aliaque mediana brevi, griseis; elongata, cylindrica, opaca, capite antice rotundato, reflexo, pronoto dense setoso, pilis brevibus erectis interspersis instructo, lateribus ante medium rotundato-arcuatis, antice et postice valde contractis, fere rectis; elytris lateraliter vix dilatatis, ante apicem flavo-penicillatis; pygidio angusto, dense griseo-squamoso; tibia antica fortiter bidentata, tarsis antennisque gracilibus, unguibus minutissime fissis.

Long. 7·5 mm.; lat. max. 4 mm.

ANNAM : Keng Trap (*R. Vitalis de Salvaza*, May).

Of this also I have seen only the male, a single specimen.

It is a species closely related to *D. multicolor* and *pulchella*, especially the latter. It is smaller, narrower, and more cylindrical in shape, and the pronotum is without the long erect hairs occurring in *D. pulchella*. The coloration and pattern are similar, but the pronotum, in addition to the yellow border, has a median line of grey setæ by which the black disc is divided into two patches, and the pale scales of the elytra form irregular longitudinal stripes, the first extending from the middle of the suture to the apex, the second from the base to beyond the middle of the elytron, and the third from the middle to near the extremity. There are two other very short longitudinal bars at the base, of which the outermost reappears just before the middle. The pygidium (in this sex) is narrow and densely clothed with grey scales.

Dichelomorpha nitidicollis, sp. n.

♂. Rufa, capite pronotoque nigris, capite, pronoti lateribus, scutello elytrisque sat dense flavo-setosis; sat angusta, capite crebre punctato, margine rotundato, reflexo; pronoto nitido, sat crebre, antice et lateraliter creberrime, punctato, disco pilis griseis erectis sat parce vestito, lateribus antice fortiter arcuatis, postice fere rectis, valde contractis; elytris lateraliter leviter arcuatis, ante apices longe sat late fulvo-penicillatis; pygidio sat dense fulvo-setoso, corpore subtus pedibusque longe fulvo-hirsutis; antennis tarsisque gracilibus, tibia antica sat fortiter bidentata, unguibus minutissime fissis.

Long. 8 mm.; lat. max. 4 mm.

UPPER MEKONG R. : Houei Sai (*R. Vitalis de Salvaza*, May).

Only a single male specimen is known. It is reddish brown, with the head and pronotum black, and clothed with rather long yellow hair beneath and with minute yellow setæ above, except upon the disc of the pronotum, which is shining black and bears only a thin clothing of erect short hairs amongst which longer hairs are scattered. The lateral margins bear close-set orange setæ, and there is a minute grey tuft at the middle of the base. The scutellum and elytra are fairly closely covered with buff-coloured setæ, which are sparser on the anterior part of the elytra and much less conspicuous at the sides. There is a rather broad ante-apical fringe of long yellow hairs crossing the suture, and a few scattered erect hairs extend forward from this in a line parallel with the outer margin. The pygidium is moderately closely covered with close-lying elongate setæ of the same colour.

Dichelomorpha rufipennis, sp. n.

Castaneo-rufa, capite pronotoque disco infuscatis, capite, pronoti lateribus, elytrorum maculis vagis basali et laterali pygidioque setis fulvis minutis, pronoti macula parva basali, scutello, elytrorum sutura postice et macula mediana transversa setis pallidioribus sat dense vestitis, corpore subtus sat dense fulvo-vestito; modice elongata, parum convexa, capite et pronoto densissime punctulatis, clypeo brevi, margine arcuato, fortiter reflexo, pronoto quam longitudine paulo latiori, lateribus fortiter arcuatis, angulis omnibus obtusis; elytris sat longis, modice nitidis, ante medium dilatatis, ad suturam postice sat longe fulvo-penicillatis, angulis apicalibus paulo rotundatis; antennis tarsisque gracilibus, unguibus minute fissis.

Long. 10–11 mm.; lat. max. 6 mm.

TENASSERIM MTS., Siam Border (*K. G. Gairdner*).

Two male specimens are all that I have seen of this. It is a rather large species, and its chestnut-red elytra are in well-marked contrast to the black pronotum, of which the front and side margins are also reddish. The scales with which the upper surface is decorated are of two shades of yellow, pale upon the inner part and deep orange upon the outer. The pronotum is almost circular in its outline and relatively longer than in the four species just described, and the elytra are not long in proportion, their sides being distinctly dilated near the middle. *Dejeania brenskei*, Nonfr., so far as can be judged from the description, resembles *D. rufipennis*, but the twice-stated dimensions indicate an insect much larger than any species of the genus at present known to me. Nonfried's statement that the claws of *D. brenskei* are entire is most probably incorrect.

Dichelomorpha uniformis, sp. n.

Obscura, supra fusco-brunneo- vel olivaceo-brunneo-squamosa, pronoto griseo-circumdato, corpore subtus pedibusque griseo-hirsutis; parum elongata, capite brevi, clypeo nudo, nitido, grosse punctato, margine truncato, reflexo; pronoto transverso, convexo, lateribus arcuatis, haud angulatis, angulis anticis et posticis obtusis; elytris ante medium leviter dilatatis, postice setis nonnullis erectis parce instructis, haud penicillatis; tibia antica bidentata, unguibus omnibus sat profunde fissis:

♂, latior, pygidio densissime fulvo-squamoso, angusto, verticali, pedibus crassis, tarsis intermediis abbreviatis, posticis elongatis, antennis modice elongatis:
♀, pygidio brevi, *minus dense griseo-setoso.*
Long. 6–6·5 mm.; lat. max. 3·5 mm.

INDO-CHINA, LAOS: Luang Prabang, Xieng Khouang (*R. Vitalis de Salvaza*, April and May).

Although very different in appearance, owing to the dark colour of the scales with which the upper surface is clothed, this species is nearly related to *D. ochracea*, Burm., and of similar size and shape. It is of a very short and compact form, especially in the male, the upper surface clothed with very densely packed dark setæ, paler at the extreme edge of the pronotum and with a few longer outstanding setæ placed in rows upon the posterior part of the elytra, the lower surface clothed with decumbent whitish hairs.

The male and female as usual differ considerably. The pygidium is densely clothed with yellow scales in the male and has less closely packed grey setæ in the female. In the male the legs are very stoutly formed (although the front tibia is rather less massive than in that sex of *D. multicolor* and *pulchella*), the middle tarsi are short and thick and the hind tarsi long and slender. The club of the antenna is of moderate length only.

Dichelomorpha pallida, sp. n.

Rufa, corpore supra squamis pallide flavis, subtus pedibusque setis griseis dense vestita, pronoti linea mediana, scutello singulique elytri parte mediana pallidioribus, humeris minus dense vestitis, rufis; parum elongata, convexa, capite fusco-rufo, rugoso, erecte setoso; pronoto medio dilatato, lateribus antice et postice fortiter contractis, fere rectis, angulis omnibus obtusis; elytris ante medium leviter dilatatis, postice haud penicillatis:
♂, pedibus validis, tibiis anticis acuminatis, haud dentatis, tarsis intermediis brevissimis. crassis, posticis elongatis; pygidio elongato, verticali, dense fulvo-squamoso; antennis modice elongatis:
♀, pedibus minus crassis, tibia antica extus minute dentata; pygidio lato, minus dense flavo-setoso.
Long. 9–10 mm.; lat. max. 4–5 mm.

MALAY PENINSULA: Penang (*Lamb*).

Allied to *D. ochracea*, but larger and a little more elongate in shape. The body is densely clothed above with bright yellow scales, which are of a paler tint upon the median line of the pronotum, the scutellum, and the median part of each elytron. The legs and lower surface are clothed with rather thick greyish-yellow pubescence, through which the reddish colour of the integument is visible. At the shoulders of the elytra the scales change to narrow setæ, which also leave exposed the red underlying surface.

In the male the legs are extremely massive, the front tibia is without the usual strong lateral tooth but tapers to a point at the extremity, the middle tarsi are extremely short and the hind tarsi moderately long, but less slender than in *D. ochracea*. The abdomen is very strongly contracted in this sex, the pygidium long, vertical, and densely clothed with yellow scales.

In the female the front tibia has a very small and inconspicuous lateral tooth, all the tarsi are moderately slender, and the pygidium is broad and clothed with grey setæ.

Dichelomorpha aranea, sp. n.

Brunnea, squamis brunneis et griseis dense vestita, clypeo, pronoti margine angusto, vitta mediana antice abbreviata, scutello, elytrorum sutura postice lineisque utrinque duabus longitudinalibus pygidioque griseo-squamosis, pronoto et elytris sat parce setis erectis nonnullis brevibus albis instructis, corpore subtus pedibusque denso griseo-hirsutis; parum elongata, clypeo antice rotundato, reflexo, pronoto lato, lateribus medio dilatatis, antice et postice fere rectis, valde contractis; elytris post humeros dilatatis, deinde angustatis, postice haud penicillatis; tibiis anticis valde bidentatis:

♂, pedibus robustis, anticorum unguibus fissis, clava antennali modice elongata:

♀, pedibus minus robustis, tarsis sat gracilibus, unguibus omnibus fissis, segmento ventrali quinto permagno, pygidio parvo.

Long. 5–6·5 mm.; lat. max. 3–3·5 mm.

N. Borneo, Sarawak: Puak (*G. E. Bryant*, April, May).

This evidently resembles the very insufficiently described *D. borneensis*, Brenske, but it is smaller, and the pale border of the pronotum is not confined, as in that species, to the front and lateral margins. As in *D. borneensis*, the pronotum and elytra bear pale scattered scales standing out from the rest, those upon the elytra being arranged in longitudinal rows. The upper surface is closely clothed with brown scales, replaced by white scales at the margins of the pronotum and an incomplete median line, as well as upon the scutellum and three longitudinal lines upon each elytron, the first bordering the suture and abbreviated anteriorly.

The white lateral border of the pronotum is a little dilated at the hind angle, and the median line is also dilated at the base and is sometimes not produced far beyond it.

This is a much more elongate species than *D. ochracea*, *uniformis*, and *pallida*. The prothorax is rather large relatively and strongly contracted both in front and behind, producing a narrow-waisted form.

The above description applies only to the male. In this sex the front claws alone are cleft, but in female specimens, which I believe to belong to the species, all the claws are cleft, in addition to which there are no pale markings upon the upper surface, the 5th ventral segment is greatly enlarged, and the pygidium much reduced.

Diphycerus tonkinensis, sp. n.

Niger, elytris interdum castaneis; ovatus, compactus, capite crebre granuloso, erecte griseo-piloso, clypeo breviter semicirculari; pronoto convexo, dense varioloso, basi lævi lineaque basali mediana elevata, pilis longis erectis sparsuto setisque flavidis prope latera et angulos posticos vestito, antice angustato, angulis anticis fere acutis. posticis rectis, lateribus post medium angulatis; scutello antice nitido, utrinque dense flavido-squamoso, squamis elongatis, convergentibus; elytris profunde sat crebre punctatis, squamis elongatis nonnullis albidis vestitis; pygidio magno, setis albidis adpressis æqualiter haud dense vestito; corpore subtus, propygidio pedibusque setis longioribus et densioribus similiter vestitis:

♂, minor, pedibus antennisque longissimis, prothorace antice attenuato, abdomine toto tecto:

♀, major, magis ovata, antennis pedibusque modice gracilibus, abdomine postice haud tecto.

♂. Long. 5·5 mm.; lat. max. 3 mm.

♀. Long. 7–8 mm.; lat. max. 4 mm.

TONKIN: Chapa (*R. Vitalis de Salvaza*, May, June); LAOS: Pak Lay (*R. V. de Salvaza*, Nov.).

This is very similar to the typical species, *Diphycerus davidis*, Fairm., of Eastern China, the pronotum of which is less densely punctured. It appears to resemble still more the second Chinese species, *D. reitteri*, Sem., of which only the female has been described. In that sex of the new species the tuft of scales upon the scutellum is yellow, instead of white, and the scales are erect and not decumbent.

The two sexes differ considerably, as in all these insects. The male is much smaller than the female, with the prothorax attenuated in front, the abdomen and elytra much shorter, the legs and antennæ very long and slender, and the club of the latter as long as the footstalk. The pygidium is inclined inwards and the abdomen greatly contracted and completely covered by the elytra. In addition, the elytra of three females collected by M. Vitalis are of a deep red colour, whilst those of the males are black.

Diphycerus alcedo, sp. n.

♂. Niger, elytris cyaneis, nitentibus; parvus, brevis, totus griseo-hirtus; capite rugoso, clypeo parum brevi, antice truncato, labro porrecto; pronoto convexo, antice valde attenuato, quam longitudinem vix latiori, densissime varioloso, erecte nigro-piloso, lateribus setis albidis adpressis ornatis, basi nitido, medio profunde bi-inciso, angulis omnibus acutis; scutello antice nitido, impresso, utrinque setis flavidis convergentibus ornato; elytris brevissimis, conjunctim subrotundis, post humeros valde dilatatis, ubique setis minutis decumbentibus pilisque erectis longis nigris vestitis; pygidio modico, corpore subtus, propygidio pedibusque densius albovestitis, pedibus antennisque longissimis.

Long. 5 mm.; lat. max. 3 mm.

Sikkim: Darjeeling, Kalimpong, Peshoke (April, May).

This little insect, of which I know the male only, is remarkable for the extreme abbreviation of its hind-body, the elytra, which cover the much-contracted abdomen, being conjointly as broad as they are long. The pronotum, on the other hand, is narrow and attenuated in front, and the clypeus is longer than in the other known species. Instead of being rounded in front this is truncate, and the labrum is extruded and placed almost in the same plane. The maxillæ are furnished with long and prominent tufts of hair.

The peculiarity of the mouth-structure renders it probable that a new genus may ultimately have to be made for this species, but it is desirable to await the discovery of the female in view of the great disparity between the sexes of these insects.

Diphycerus jucundus, sp. n.

♂. Æneo-niger, elytris fulvis, basi et sutura obscuris; oblongus, parum convexus, ubique griseo-hirsutus, corpore supra pilis longioribus fuscis intermixtis instructo; capite dense, clypeo grossius granulato, hoc late transverso, truncato; pronoto quam longitudinem paulo latiori, modice convexo, antice angustato, coriaceo, basi vittaque mediana antice evanescenti lævigatis, baseos medio profunde biinciso, angulis omnibus fere rectis; scutello cordiformi, lævi, antice bilobato, medio leviter impresso, lateribus albido-setosis; elytris inæqualiter haud profunde aut crebre punctatis, setis brevibus albidis vage aggregatis prope suturam ornatis pilisque longis obscuris sat parce interspersis; pygidio subnitido, longe hirsuto; corpore subtus pedibusque ubique sat dense albido-pubescentibus.

Long. 5–6 mm.; lat. max. 2·5–3 mm.

TIBET: Siao-lou.

Of this species also I have seen only males. There is little superficial resemblance to the other species of the genus. It is a more oblong and less convex insect, clothed both above and beneath with long erect hair. There is a slight metallic green lustre, except upon the head (which is densely rugose and opaque, with the clypeus straight in front and very short) and the bright yellow outer part of the elytra. The scutellum is smooth and bears only an external fringe of white setæ, and the elytra are decorated in the sutural region with vaguely-indicated clusters of similar but not erect setæ. The pronotum and elytra are less strongly sculptured than in the preceding species, and the elytra are less dilated behind the shoulders and only slightly narrowed behind. The pygidium is clothed with very long hairs. The antennæ, as usual in the male, are very slender and the legs are moderately long.

XENOCERASPIS, gen. nov.

Corpus elongatum, antice angustatum, parum convexum, haud squamosum. Clypeus brevis. Oculi parvi. Prothorax angustus, antice paulo attenuatus, basi utrinque exciso et angulatim producto. Scutellum latum, postice haud acuminatum. Elytra paulo deplanata, postice separatim rotundata. Abdomen postice haud tectum. Antennæ graciles, 10-articulatæ. Pedes robusti; tarsi longi, unguibus validis, æqualibus, pedis antici fissis, reliquis integris. Tibia antica bidentata. Coxæ posticæ extus prominentes. Abdomen subtus 6-articulatum.

♂. Pedes robustiores, tarsis intermediis valde contractis et incrassatis, femoribus posticis majoribus, tibiisque intus late angulatim productis, calcaribus nullis.

Although closely related in all essentials to *Dichelomorpha* this genus is very different in its general aspect. It is not clothed with scales, but with rather coarse hairs and setæ. The interlocking mechanism of the pronotum and scutellum is much more developed than in *Dichelomorpha*, the base of the pronotum being furnished with two angular projections fitting into deep notches formed between the scutellum and elytra. Between the two projections is a rounded lobe, and the excisions between this and the former are not sharp but rounded. The prothorax is much narrower than the elytra, but is relatively broad behind and narrow in front. Both front and hind angles are sharp, especially in the male. The scutellum is broad, almost transverse, extremely blunt behind. The elytra are rather flat, with a prominence at the shoulder but dilated behind it, separately rounded at the extremity and not covering the abdomen behind. The latter is not long, and consists of six visible segments ventrally. The front coxæ are very prominent vertically, the hind coxæ produced and prominent laterally, the front tibiæ have two not very acute teeth and all the tarsi are long, except the middle ones in the male. The claws are long, stout, and symmetrical, not blunted at the tips, those of the front feet cleft and the rest entire. The antennæ are slender in both sexes, joints 2 and 7 stout and all the rest elongate.

In the male the legs are much stouter than in the female, the front tibia is narrower and the teeth much closer together, the middle tarsus is very strongly contracted, its 2nd, 3rd, and 4th joints saucer-shaped, but each angularly produced externally, the hind coxa is broader and more exposed laterally, the hind femur thickened and a little arched, the hind tibia produced into a broad angular plate internally and without terminal spurs. The abdomen is not arched, the pygidium is broad and the propygidium not exposed.

In the female the abdomen is very convex beneath, the propygidium and pygidium are exposed and the latter is very oblique.

Xenoceraspis dispar, sp. n.

Rufo-castaneus, corpore subtus nigro, pedibus rufis, genubus infuscatis; capite crebre rugoso-punctato, clypeo brevi, lato, margine reflexo, fere recto, pronoti lateribus post medium angulatis, antice fere rectis, valde contractis, postice sinuatis; scutello lævi, nitido, utrinque minutissime punctulato, flavo-setoso; elytris alutaceis, flavo-setosis:

♂, pronoto dense punctato-rugoso, minute pallide setoso, basi medio albo-penicillato, lateribus post medium fortiter angulatis, antice valde contractis, angulis posticis productis; elytris sat nitidis, parce et minute pallido-setosis; pygidio lævi, nitido,

♀, pronoto paulo breviori, angulis minus acutis, dorso densissime fulvo-hirto, pilis longioribus obscuris sparsis; elytris ubique setis griseis haud minutis vestitis; propygidio et pygidio similiter vestitis, detectis.

Long. 8·5–10 mm.; lat. max. 4·5–5 mm.

SIKKIM: Gopaldhara, Rungbong Valley (*H. Stevens*).

The two sexes of this interesting insect are remarkably dissimilar. The male is only very thinly clothed with pale setæ on its upper surface, but with a conspicuous tuft on each side of the scutellum and one in the middle of the base of the pronotum. The elytra are gently expanded at the sides, the pygidium is smooth and shining and not covered by the elytra.

In the female the pronotum is very densely clothed with a uniform erect golden-yellow pubescence, with a narrow median line of a paler yellow and very long erect dark hairs thinly distributed amongst the rest. The elytra are moderately closely clothed with rather coarse decumbent yellow hairs, with similar long dark hairs scattered thinly amongst them, and the pygidium and propygidium are similarly clothed and both exposed. The pronotum is less narrowed in front, with its front, hind, and lateral angles less sharp than in the male.

LII.—*Description of a new Genus and Species of* Cicadidæ *from Cuba*. By W. L. DISTANT.

A SPECIMEN of this interesting genus and species was recently sent to me by Mr. Ashton of Sydney among other Cicadidæ from Australia and various neotropical localities for identification. The latter he had received from Herr Rolle, a well-known dealer in Berlin, and I have placed the type in the collection of the British Museum.

JUANARIA, gen. nov.

Body robust, somewhat short; abdomen in male about as long as space between apex of head and base of cruciform elevation; head broad, including eyes narrower than base of mesonotum, ocelli considerably farther apart from eyes than from each other, face somewhat strongly convex, a little prominent above; pronotum with the lateral margins ampliated, medially angulate, anterior femora spined beneath near apices; abdomen short and broad, above centrally longitudinally arched; tympanal coverings imperfect, inwardly exposing orifices; opercula in male short and broad; rostrum reaching the posterior coxæ; tegmina and wings more or less opaque, the first with the basal cell a little longer than broad, the costal membrane only moderately dilated or arched, apical areas eight in number.

This genus has a very considerable resemblance in general appearance to the genera *Platypleura* and *Yanga*, but separated at once by the imperfect tympanal coverings which considerably expose the tympanal orifices, and thus locates it in the subfamily Gæaninæ. I have placed it near the genus *Odopœa*.

Juanaria mimica, sp. n.

♂. Head and pronotum dull virescent mottled with brown, the lateral and posterior marginal areas of the pronotum, the posterior central area of the mesonotum, and its cruciform elevation more distinctly virescent; eyes and ocelli shining brownish ochraceous; abdomen above dull dark castaneous, the tympanal coverings a little paler in hue; body beneath and legs pale ochraceous and more or less greyishly pilose, the legs, rostrum, and disk of abdomen beneath not or scarcely pilose, tegmina greyishly opaque with darker mottlings, and the basal cell, the bases of the two lower ulnar areas, and the claval area pale transparent; wings pale bronzy brown, the extreme base and claval area paler and more transparent.

Long., excl. tegm., ♂, 36; exp. tegm. 106; breadth between pronotal angles 18 mm.

Hab. Cuba, Cuantanamo.

LIII.—*Rhynchota from New Caledonia.*
By W. L. Distant.

[Continued from p. 164.]

Part II.

HOMOPTERA.

Fam. Cicadidæ.

Subfam. *Tibicininæ.*

Genus Abricta, Stål.

Abricta flavoannulata, sp. n.

♂. Head, pronotum, and scutellum castaneous brown; margins and a central longitudinal fascia to pronotum ochraceous, the anterior margin narrow, the posterior margin inwardly black, the central fascia dilated at base; abdomen above castaneous brown, the basal segment ochraceous, remaining segments with their basal marginal areas black; sternum castaneous brown, its lateral segmental areas more or less ochraceous; legs castaneous, apices of intermediate and posterior femora ochraceous, intermediate and posterior tibiæ ochraceous, their bases and apices narrowly castaneous; opercula castaneous margined with ochraceous; abdomen beneath very pale castaneous, the lateral margins and apex castaneous brown; tegmina hyaline, the venation, two contiguous spots at apices of the two upper ulnar area to tegmina and the costal membrane to same, and margins of claval area to posterior wings fuscous brown; ocelli shining red; eyes black, their anterior areas dull ochraceous; lateral margins of the pronotum shining black, distinctly but somewhat bluntly toothed near base; rostrum reaching the posterior coxæ; opercula in ♂ short and broad, not meeting centrally, and apically rounded, but only just passing the anterior margin of the basal abdominal segment; tympanal coverings absent.

Long., excl. tegm., ♂ 35–36, ♀ 29; exp. tegm., ♂, 95–102 mm.

Hab. Plaine des Lacs.

Allied to the Australian species *A. curvicosta*, Germ.

Genus UEANA, Dist.

Ueana lifuana.

Ueana lifuana, Montr. (*Cicada*) Ann. Soc. Ent. Fr. (4) i. p. 70 (1861).

Hab. Noumea, Mt. Mou.

Ueana harmonia.

Ueana harmonia, Kirk. Trans. Ent. Soc. 1905, p. 329, t. xvii. fig. 1.
Ueana polymnia, Kirk. *loc. cit.* t. xvii. fig. 2.

Hab. Mt. Mou, Mt. Koghi.

Ueana montaguei, sp. n.

Head, pronotum, and mesonotum pale greenish; narrow anterior margin of head, antennæ and a small spot above their insertion, eyes, marginal lines defining a central longitudinal fascia to pronotum, and the margins of two obconical spots at base of mesonotum and a few sublateral spots to same dark purplish brown; abdomen above ochraceous, the posterior segmental margins and the whole of the apical segment castaneous; head beneath, sternum, and legs pale greenish, two central longitudinal fasciæ to face and outer margins of same, apex of rostrum, broad apices to anterior tibiæ and tarsi, longitudinal streaks to femora and the tarsi black or fuscous; abdomen beneath ochraceous; tegmina and wings hyaline, costal area to tegmina ochraceous, venation to both tegmina and wings fuscous; face centrally longitudinally sulcate and transversely striate; anterior femora incrassated and strongly spined beneath; rostrum about reaching the posterior coxæ.

Long., excl. tegm., 16; exp. tegm. 42–47 mm.

Hab. Mt. Mou.

Allied to *U. rosacea*, Dist., but a much smaller species, different markings of the face, &c.

Ueana rosacea.

Ueana rosacea, Dist. Ann. & Mag. Nat. Hist. (6) ix. p. 322 (1892).
? *Cicada artensis*, Montr. Ann. Soc. Ent. Fr. (4) i. p. 70 (1861).

Hab. Near Dumbea.

Ueana maculata.

Ueana maculata, Dist. Ann. & Mag. Nat. Hist. (7) xvii. p. 385 (1906).

Hab. Mt. Koghie.

Genus KANAKIA, Dist.

Kanakia typica.

Kanakia typica, Dist. Ann. & Mag. Nat. Hist. (6) x. p. 62 (1892).

No exact locality.

Genus ABROMA, Stål.

Abroma pumila, Dist.

Tibicen pumilus, Dist. Ann. & Mag. Nat. Hist. (6) x. p. 65 (1892).

Hab. Near Noumea.

Genus MELAMPSALTA, Kolenat.

Melampsalta germaini.

Melampsalta germaini, Dist. Ann. & Mag. Nat. Hist. (7) xvii. p. 387 (1906).

Hab. Tiaré.

Melampsalta quadricincta.

Melampsalta quadricincta, Walk. (*Cicada*) List Hom. i. p. 191 (1850).

Hab. Plaine des Lacs, Kuakué.

Also recorded from Australia and New Zealand.

Melampsalta latorea.

Melampsalta latorea, Walk. (*Cicada*) List Hom. i. p. 183 (1850).

Hab. Plaine des Lacs.

Widely distributed in Australia.

Melampsalta depicta, sp. n.

Head black, a marginal spot above the insertion of the antennæ and a basal spot between the ocelli ochraceous; pronotum and mesonotum ochraceous, the first with two large contiguous spots on each lateral area and a small angulated spot between them near base, mesonotum with two fused spots on anterior margin continued as a subcruciform spot towards base, and a longer sublateral spot on each side black; abdomen black, the segmental margins ochraceous; body beneath black; lateral margins of face, lateral areas of sternum, the opercula, and broad lateral margins to abdomen beneath luteous or ochraceous; legs luteous, anterior femora beneath black and armed with three strong spines; opercula not quite meeting inwardly and not reaching the base of abdomen, their apices rounded; rostrum just passing the intermediate coxæ; tegmina and wings hyaline, costal membrane to the first ochraceous, the postcostal area black.

Long., excl. tegm., 17; exp. tegm. 55 mm.

Hab. Plaine des Lacs, Mt. Koghi, Mt. Mou.

Melampsalta dumbeana, sp. n.

♀. Head black, with a green basal spot behind the ocelli; pronotum green, with two small transverse spots at middle of anterior margin, and the whole of the lateral areas enclosing two green spots at base black; mesonotum green, with a broad elongate spot on each lateral area, and a large central spot—broadest anteriorly and attenuated to base, where it is dilated on each side—black; all these black spots more or less margined with ochraceous; abdomen above black, the posterior segmental margins green; body beneath black, the lateral margins ochraceous; legs more or less castaneous, apices of the femora luteous, bases of the intermediate and posterior tibiæ virescent; tegmina and wings hyaline, the venation and costal membrane dark castaneous; anterior femora thickened and with three black spines beneath. Rostrum passing the intermediate coxæ.

Long., excl tegm., 21; exp. tegm. 65 mm.

Hab. Dumbea.

MOUIA, gen. nov.

♂. Head (including eyes) about as wide as base of pronotum, only about half as long as breadth between eyes, the anterior margin moderately truncate, more or less longitudinally incised; face longer than broad, the head on each side of it moderately laterally foveate; pronotum about half as long as broad at base, the basal marginal area distinctly moderately protuberant at each lateral angle; mesonotum (including cruciform elevation) a little longer than head and pronotum together; tympana entirely exposed; opercula not completely covering the sonorous cavities but almost meeting each other at base, their apical margins broadly rounded; rostrum reaching the intermediate coxæ; abdomen short, robust, scarcely longer than breadth at base, basal margins of the dorsal segments prominent; anterior femora strongly incrassated and prominently spined beneath; tegmina and wings hyaline; tegmina with the upper vein of the lower ulnar area more or less fused with the lower vein to the radial area beyond the apex of the basal cell.

Included in the division Melampsaltaria, Dist.

Mouia variabilis, sp. n.

♂. Body above dull virescent; body beneath, legs, and rostrum ochraceous; ocelli shining reddish ochraceous; eyes piceous; tympana pale purplish brown; anterior femora beneath with three strong blackish spines, decreasing in length from basal spine; rostrum reaching the intermediate coxæ, its apex black; opercula with the lateral and apical margins broadly rounded, not meeting at inner margins nor completely covering the sonorous cavities; tegmina and wings hyaline, venation blackish, more ochraceous on basal half.

Long., excl. tegm., ♂, 29; exp. tegm. 80 mm.

Var. *a.*—Body above dull greenish.

Var. *b.*—Head and pronotum dull greenish; abdomen reddish ochraceous.

Var. *c.*—Body above pale sanguineous.

Hab. Mt. Mou, Plaine des Lacs.

Fam. **Fulgoridæ.**

Subfam. *Dictyopharinæ.*

Genus MONTROUZIERANA.

Montrouzierana, Montr. Ann. Soc. Ent. Fr. (4) i. p. 72, note (1861).

Montrouzierana oxycephala.

Pseudophana oxycephala, Montr. Ann. Soc. Ent. Fr. (4) i. p. 72 (1831).
Montrouzierana oxycephala, ibid., note.

Hab. Mt. Mou, Plaine des Lacs.

Subfam. *Flatinæ.*

Colgar limbata.

Phyllyphanta limbata, Montr. Ann. Soc. Linn. Lyon, n. ser. 1864, p. 243.

Hab. Plaine des Lacs.

Subfam. *Cixiinæ.*

Cixius aragoensis, sp. n.

Body above bright ochraceous, abdomen above a little darker and more testaceous; eyes black; tegmina very pale ochraceous, the venation a little darker; head a little longer than broad, anterior and lateral margins strongly upwardly carinate; disk of pronotum somewhat flattened, centrally longitudinally carinate, its lateral carinations more rounded and angularly attenuated posteriorly; body beneath and legs pale shining ochraceous; apices of the tarsi black; abdominal apex black.

Long., incl. tegm., 6 mm.
Hab. Mt. St. Arago.

Cixius montaguei, sp. n.

Head and body above dull dark ochraceous, the anterior and lateral margins to head, the margins and three longitudinal carinate lines to pronotum stramineous; eyes black; body beneath and legs pale ochraceous; tegmina pale hyaline, the venation on about apical half darkly infuscate, the apical areas very distinctly and blackly veined; face moderately and centrally carinate; apices of the tarsi black.

Long., incl. tegm., 5 mm.
Hab. Upper Houadou R.

Cixius varicolor, sp. n.

Head and pronotum dark ochraceous, eyes and lateral pronotal areas black; carinate margins of head and central carinations to pronotum pale ochraceous; abdomen above with basal half ochraceous spotted with black, posterior half black; face ochraceous between eyes, remaining area pale dull blackish, the lateral margins and central longitudinal carination ochraceous; abdomen beneath imperfectly seen in carded typical specimen; legs ochraceous; tegmina pale hyaline, reflecting the darker abdomen beneath, the veins narrowly blackish, a prominent marginal longitudinal black spot a little before apex; lateral margins of head distinctly laterally marginally carinate; pronotum centrally, submarginally, and anteriorly carinate.

Long., incl. tegm., 5 mm.

Hab. Houadou.

Cixius apicimaculatus, sp. n.

Head and pronotum dark ochraceous; anterior and posterior margins of head and central longitudinal carinations to pronotum pale ochraceous; tegmina hyaline, the veins on apical area black; body beneath and legs ochraceous; eyes blackish; anterior and posterior margins of head carinate, eyes elongate, slightly extending beyond the anterior lateral margins of pronotum, the longitudinal carinations to pronotum very distinct; posterior areas of tegmina with the transverse veins and the apical margin more prominently black.

Long., incl. tegm., 4½ mm.

Hab. Upper Houadou R.

Subfam. *DERBINÆ.*

Nisia rubrofasciata, sp. n.

Head and pronotum ochraceous; eyes black; scutellum and tegmina greyish white; lateral margins of pronotum and an inner longitudinal fascia to tegmina sanguineous; body beneath and legs pale ochraceous; head (including eyes) narrower than pronotum, moderately produced in front of eyes, the lateral margins distinctly ridged, the disk depressed; pronotum with a central, longitudinal, somewhat carinate line; apices of the tarsi palely black.

Long., incl. tegm., 6½ mm.

Hab. Upper Houadou R.

Nisia albonotata, sp. n.

Pale ochraceous, the pronotum and scutellum darker ochraceous, the head, anterior margin of pronotum, and anterior and lateral margins of the tegmina greyish white; eyes black; vertex of head with the anterior angles moderately acutely produced; pronotum longitudinally tricarinate.

Long., incl. tegm., 4 mm.

Hab. Rhoo, Houadou R.

A single example of this species in somewhat compressed condition.

Fam. Cercopidæ.

Subfam. *APHROPHORINÆ.*

Ptyelus ignambianus, sp. n.

Head above greyish white, the anterior margin very narrowly and three transverse linear fasciæ castaneous; pronotum and scutellum castaneous, a transverse anterior medially broken fascia to pronotum, and the basal margin of scutellum greyish white; tegmina castaneous, a transverse spot about middle of costal margin, another spot near apex of same, two small transverse spots on inner apical margin, and two small spots at apex of clavus more or less greyish white; body beneath and legs (imperfectly seen in carded specimen) brownish ochraceous, apices of tarsi black; head above roundly oblique, its greatest length a little shorter than pronotum, its basal margin convexly excavate between the eyes; scutellum angularly convex at base; tegmina thickly, very finely punctate; face castaneous, centrally longitudinally and laterally transversely pale ochraceous; posterior tibiæ with two slender spines.

Long. 5½ mm.

Hab. Ignambi.

Var.—Pronotum without the anterior submarginal pale transverse fascia.

Hab. Mt. Arago.

Apparently allied to *P. lineolus*, Montr.

Ptyelus pampaianus, sp. n.

Head ochraceous, with a broad central longitudinal fascia and a transverse linear spot on each side near inner margins of eyes dark castaneous; pronotum and scutellum very dark castaneous, the first with a centrally broken anterior ochraceous margin, and the scutellum with its apex ochraceous; tegmina very dark castaneous, base of costal margin and the anterior area ochraceous, somewhat maculately so on inner and outer margins of claval area, a spot near middle of costal margin, and a larger marginal spot a little before apex greyish white; body beneath imperfectly seen in carded specimen; legs ochraceous, apices of tarsi black; head roundly oblique, its greatest length about equal to that of pronotum, which is very thickly and rather coarsely punctate; tegmina densely but more finely punctate; apices of tarsi black.

Long. 4 mm.
Hab. Pampai.

Ptyelus panieanus, sp. n.

Ochraceous, eyes black; tegmina with an oblique fascia near middle and a subapical marginal spot greyish white; legs more or less ochraceous, with darker macular suffusions; tarsi very pale ochraceous, with their apices black; body beneath imperfectly seen in carded specimens; head obliquely rounded, about as long as middle of pronotum; head, pronotum, and scutellum very finely and densely punctate; legs pale castaneous, more or less shaded with black, posterior tibiæ with two distinct spines, tarsi more or less pale ochraceous.

Long. 6 mm.
Hab. Mt. Panié.

Ptyelus montaguei, sp. n.

Body above very dark castaneous, almost black; a small spot at inner margins of eyes and two large contiguous discal spots to pronotum bright ochraceous; scutellum pale castaneous; an oblique narrow fascia crossing tegmina before middle and a large marginal spot near apex of same greyish white; femora and tibiæ more or less blackish, tarsi ochraceous with their apices black; head somewhat sharply oblique, a little longer than pronotum, the whole upper surface thickly finely punctate; posterior tibiæ with two spines.

Long. 5½ mm.
Hab. Ignaumbi, Pampai, Mt. St. Arago.
Var. *a.*—Pronotum without the two pale discal spots.
Hab. Houadou.

Ptyelus sex-maculatus.

Ptyelus sex-maculatus, Montr. Ann. Soc. Ent. Fr. ser. 4, i. p. 71 (1861).

Hab. Houadou, Mt. Mou.

Ptyelus rhoonensis, sp. n.

Head, pronotum, and scutellum black, anterior margin of head distinctly carinate and ochraceous; tegmina brassy brown, with two greyish-white marginal spots, the first and smallest at about middle of costal margin, the other and largest spot on costal margin a little before apex; legs black, bases of tarsi pale ochraceous; body beneath imperfectly seen in carded specimen; head (excluding the slightly raised anterior margin) thickly finely punctate; pronotum thickly finely punctate, slightly convexly raised and centrally longitudinally depressed; tegmina thickly finely punctate; posterior tibiæ with two medial spines.

Long. 4½ mm.

Hab. Rhoo, Houadou R.

Ptyelus nocturnus, sp. n.

Black; tegmina with a prominent white subapical marginal spot; head distinctly shorter than the pronotum, the whole upper surface distinctly, thickly, finely punctate; posterior tibiæ with two distinct spines.

Long. 5 mm.

Hab. Ignambi.

Clovia montrousieri, sp. n.

Head, pronotum, and scutellum reddish ochraceous, extreme margin of head black; pronotum with four central, longitudinal, broadly raised carinæ which are darker and more rufous in hue; tegmina with more than basal halves dark rufous-brown, opaque, about apical third hyaline, the veins fuscous, and with an inner, curved, apical, dark fascia; legs ochraceous, apices of the tibiæ and tarsi more or less black; head continuing on base the rufous raised carinæ of the pronotum, anteriorly narrowed, and about as long as the pronotum, eyes black; scutellum distinctly broadly, centrally, longitudinally excavate; body beneath ochraceous.

Long. 7–8 mm.

Hab. Central District; Upper Houadou R., Rhoo.

BYREBISTUS, gen. nov.

Head much shorter than broad between eyes, subconically rounded in front, the central lobe a little globosely prominent; eyes oblique, somewhat large and prominent, ocelli placed centrally near base, nearer to each other than to eyes; pronotum depressed anteriorly, broader at base than long, lateral angles subprominent, anteriorly depressed, basal margin almost straight; scutellum almost as long as broad, centrally, strongly, longitudinally depressed; tegmina much longer than body; posterior tibiæ with a moderately short spine at about one-third from apex; other structural characters imperfectly seen in carded specimen.

I have placed this genus somewhat near *Sounama*, Dist., from British India.

Byrebistus nigritarsus, sp. n.

Bright shining ochraceous; ocelli, eyes, and apices of tarsi black; body beneath imperfectly seen in carded type; head with the central lobe subglobosely elevated; pronotum thickly finely punctate, slightly centrally longitudinally depressed on basal area, a short, central, more impunctate, transverse space behind anterior margin; scutellum finely thickly punctate, strongly, centrally, longitudinally impressed; tegmina with the claval area and about basal third of costal area thickly punctate; apex of the spine to posterior tibiæ black; veins on apical halves of tegmina prominent and slightly darker in hue.

Long. 8 mm.
Hab. Mt. Ignambi.

Family Jassidæ.

Subfam. *LEDRINÆ*.

Petalocephala aurescens, sp. n.

Bright shining ochraceous, apical areas of the tegmina very pale ochraceous; eyes black; head with a few profound punctures defining an anterior submarginal area; pronotum thickly finely punctate; scutellum with the basal area a little darker, and thickly, very finely punctate, the apex and narrow lateral margins paler and less punctate; tegmina with the veins moderately prominent; posterior tibiæ longly finely spinose.

Long. 5½–7 mm.
Hab. Houadou.

Carchariacephalus forestieri.

Carchariacephalus forestieri, Montr. Ann. Soc. Ent. Fr. (4) i. p. 71 (1861).

Hab. Central District, Rhoo.

Subfam. *BYTHOSCOPINÆ.*

Bythoscopus montaguei, sp. n.

Ochraceous, head, anterior margin of pronotum, scutellum, and legs paler in hue; eyes blackish; two small tubercles before anterior margin of pronotum, the disc very thickly, finely, transversely striate; scutellum with a dark spot in each basal angle and with a distinct central longitudinal carination terminating in a distinct dark angulate incision, a small dark spot at apex of clavus, the claval area somewhat coarsely punctate; posterior tibiæ thickly finely spinulose; extreme apices of tibiæ distinctly darker in hue. Body beneath indistinctly seen in carded specimen.

Long. 5½ mm.
Hab. Houadou.

Nehela albofrontalis, sp. n.

Head ochraceous; face with a large triangular white spot the angulate apex of which extends over the middle of vertex, two rounded spots on face, and inner margins of eyes black; pronotum with a narrow, central, transverse, black line which is somewhat maculate at middle; scutellum ochraceous, with a central, slender, obcruciform spot, and a linear spot near each basal angle black; tegmina ochraceous, the veins much darker, and an elongate black marginal spot a little behind middle; body beneath and legs ochraceous, imperfectly seen in carded specimen, apices of tibiæ and tarsi distinctly very dark fuscous, posterior tibiæ finely, closely, shortly spinose.

Long. 5 mm.
Hab. Upper Hovailou R.

Selenocephalus viridipes, sp. n.

Head, pronotum, and scutellum ochraceous, extreme anterior margin of vertex, eyes, extreme basal margin of pronotum, and a spot in each basal angle of scutellum much darker in hue; tegmina brownish ochraceous, the lateral areas and apex pale greenish ochraceous; body beneath and legs pale virescent; apices of tarsi dark fuscous; pronotum very finely, closely, transversely striate; posterior femora with a distinct slender spine at apex; posterior tibiæ distinctly, closely, finely spinose.

Long. 8 mm.

Hab. Mt. Arago.

Subfam. *Jassinæ.*

Tartessus coronatus, sp. n.

Shining black; anterior margin of head, anterior legs, apices of intermediate tibiæ and tarsi, spines to posterior tibiæ, apices to tarsi, and bases of posterior tarsi ochraceous; pronotum finely transversely striate; scutellum (excluding basal angles) thickly, somewhat coarsely punctate; posterior tibiæ closely, somewhat longly spinose.

Long. 8 mm.

Hab. Central District.

Allied to *T. solomonensis*, Dist., from the Solomon Islands.

Jassus neoguttatus, sp. n.

Head pale ochraceous, the ocelli and eyes black; pronotum dark ochraceous; scutellum pale ochraceous, with a darker spot at each basal angle; tegmina ochraceous, the veins fuscous, a large spot on subapical area of clavus, and about eight elongate spots on apical tegminal area greyish white; body beneath and legs ochraceous, posterior tibiæ (excluding basal areas) blackish, apices of tarsi black; head above with two central longitudinal impressions; pronotum thickly, somewhat darkly punctate; scutellum profoundly, finely transversely impressed a little below middle; posterior tibiæ thickly, finely, rather longly spinose.

Long. 6½ mm.

Hab. Central District.

Allied to *J. guttatus*, Walk., from Mysol and New Guinea.

Subfam. *Delphacinæ.*

Ugyops inermis, sp. n.

Head, pronotum, and scutellum ochraceous; face with a central longitudinal black line, an oblique reddish fascia on each lateral area, and two small reddish apical spots; pronotum with four more or less oblique black spots; tegmina more or less suffused with black, especially on apical areas; body beneath imperfectly seen in carded specimen; antennæ pale ochraceous, apex of first joint sanguineous, second joint fuscously biannulate; legs pale ochraceous, anterior and intermediate tibiæ with their bases and apices (narrowly), and with a subbasal and subapical annulation fuscous, posterior femora more or less sanguineous, tarsi more or less spotted with black; long robust spur attached to apices of posterior tibiæ ochraceous, darker at base and apex.

Long. 5½ mm.

Hab. Houadou.

Allied to *U. senescens*, Dist., from the Seychelles, but differing by the less spinous posterior tibiæ, &c.

Ugyops houadouensis, sp. n.

Allied to the preceding species, *U. inermis*, but much smaller; face with three contiguous black spots between the eyes; pronotum without the black spots; tegmina suffused with black somewhat as in *U. inermis*; antennæ in markings resembling those of *U. inermis*; legs similarly marked, but posterior tibiæ with three distinct fuscous annulations and with the subapical spur much more slender.

Long. 4½ mm.

Hab. Houadou.

Subfam. *TETTIGONIELLINÆ.*

Tettigoniella spectra.

Tettigoniella spectra, Dist. Faun. Brit. Ind. iv. p. 211 (1908).

Hab. Houadou R.

This widely distributed species is found throughout British India, and is recorded from N. Australia by Stål.

Kolla parvipicta, sp. n.

Head and scutellum ochraceous, with small brownish maculate markings; pronotum and tegmina pale brownish, with pale ochraceous maculate markings; body beneath imperfectly seen in carded specimen; legs pale ochraceous, tibiæ with small pale brownish maculate markings, a spot at apices darker and more pronounced, tarsi prominently spotted with fuscous; lateral margins of vertex in a line with outer margins of eyes, which are darker and have a prominent black marginal spot.

Long., incl. tegm., 4 mm.

Hab. Mt. Ignambi.

Kolla auriculata, sp. n.

Head ochraceous, narrow anterior margin and a curved transverse fascia between eyes, both centrally maculate, black; pronotum ochraceous, with a narrow anterior fascia centrally maculate, basal and lateral margins and a central longitudinal line black; scutellum ochraceous, basal margin black; tegmina dark fuscous, the lateral margins much paler; body beneath imperfectly seen in carded type, legs pale ochraceous; lateral margins of vertex in a line with outer margins of eyes, which are black.

Long., incl. tegm., 4 mm.

Hab. Upper Houadou R.

LIV.—*Notes on Myriapoda.*—XXV. *Preliminary Lists for Lincolnshire and Norfolk.* By Hilda K. Brade-Birks, M.Sc., M.B., Ch.B., L.R.C.P., M.R.C.S., D.P.H., and the Rev. S. Graham Brade-Birks, M.Sc.

I. INTRODUCTION.

During a short stay in Norfolk, which began at the end of May 1919 and extended into June, we collected a number of "myriapods" which it seems worth while to record. Mr. St. John Marriott had previously collected some specimens for us in the county, and these are incorporated in the detailed records which follow.

Mr. R. S. Bagnall has favoured us with a list of specimens from Lincolnshire submitted to him by the collectors, Mr. T. Stainforth of the Hull Museum and Mr. J. C. Varty-Smith of Penrith. These valuable collections, augmented by the results of a paper published by Mr. Stainforth himself (1919) and the material we obtained during July 1915 in the Martin-by-Timberland district of Lincolnshire, have furnished the data for our list in the case of that county.

Of the Lincolnshire records Mr. Stainforth's are all from the north (vice-county 54 in the Watsonian system) and Mr. Varty-Smith's all from the south (vice-county 53); our own collecting (Martin-by-Timberland district) was done near the boundary between the two. In Norfolk all the collecting referred to was done in the west (vice-county 28).

The detailed records are arranged under specific headings only; many systematic indications and dimensions of species included in the present study will be found in the twelfth paper of this series (Brade-Birks, October 1918).

In the second section of this paper other collectors' names are cited by initials; where these latter are wanting, we were the collectors ourselves. We have used as abbreviations Lns. for Lincolnshire, Nk. for Norfolk, dist. for district, M.-by-T. for Martin-by-Timberland, and syn. for synonym.

Our best thanks are due to Mr. Bagnall for his determination of Symphyla and other help, and also to the collectors of material recorded in the present paper. The incorporation of our own 1915 Lincolnshire specimens brings our early indebtedness to Dr. A. Randell Jackson of Chester pleasantly to mind; it was he who made an examination of those specimens soon after they were collected.

II. DETAILED RECORDS.

Class DIPLOPODA.

Iulus scandinavius, Latzel.

Syn. *I. ligulifer*, Latzel and Verhoeff.

This species was wrongly renamed *I. ligulifer* simply because it was unknown in Scandinavia (Verhoeff, 1891); Latzel's original name must stand. Evans (1907) says, "It seems to me, that by the rules of nomenclature, *scandinavius* is the proper specific name of this Iulid."

Three males, Messrs. Chilvers and Sons' nurseries, Heacham, Nk.

Ophyiulus pilosus (Newport).

Syn. *O. fallax* (Meinert).

One male of this or the previous species, Manton Common, Lns., *T. S.*, 13. vi. 15; male, Messrs. Chilvers and Sons' nurseries, Heacham, Nk.

Tachypodoiulus niger (Leach).

Syn. *T. albipes* (C. L. Koch).

Harlaxton, Lns., *J. C. V.-S.*; common, South Ferriby, Lns., *T. S.*, 16. x. 15; farm precincts etc., not uncommon, Heacham, Nk.

Cylindroiulus frisius (Verhoeff).

Dimensions given by Verhoeff (1891, p. 133): body of female 14–16 mm. long, 1·2–1·3 mm. broad; male 10–13 mm. long.

This species is often found on the coast of England, but may also be met with well inland. The gonopods of the male are diagnostic.

On the shore under wood (including male dissected for confirmation) and in farm precincts, inland (male also dissected), Heacham, Nk.; under a stone (male again dissected) near Sandringham, Nk. Material probably referable to the species but not confirmed by dissection, as follows:—in ants' nest, inland, Heacham, Nk.; outskirts of wood between North Wooton station and Castle Rising, Nk.

Cylindroiulus londinensis, var. *finitimus*, Ribaut.

Dimensions and other characters are mentioned in the thirteenth paper of this series (Brade-Birks, Sept. and Oct. 1918).

Under stones by roadside, Castle Rising, Nk.

Cylindroiulus londinensis, var. *teutonicus* (Pocock).

Dimensions and other characters are again indicated in our thirteenth paper (Brade-Birks, Sept. and Oct. 1918).

Under stones by roadside, Castle Rising, Nk.

Cylindroiulus punctatus (Leach).

Syn. *C. silvarum* (Meinert).

Harlaxton, Lns., *J. C. V.-S.*; male and female, M.-by-T. dist., Lns.; between bark and trunk of felled timber (male dissected for confirmation), Heacham, Nk.; outskirts of wood between North Wooton station and Castle Rising, Nk.

Cylindroiulus (*Leucoiulus*) *nitidus* (Verhoeff).

This species is dealt with at some length in our fifth paper (Brade-Birks, May 1917).

Males are necessary for definite diagnosis. Mr. Bagnall refers the following example to the species: one female, Harlaxton, Lns., *J. C. V.-S.*

At Heacham, Nk., we took several females, which are, perhaps, referable to this species.

Schizophyllum sabulosum (Linné).

Manton Common, Lns., *T. S.*, 13. vi. 15; M.-by-T. dist., Lns.; under a stone, near Sandringham, Nk.; Dersingham, Nk.; Snettisham, Nk.; one junior, outskirts of wood between North Wooton station and Castle Rising, Nk.; ?(junior), Heacham, Nk.

Isobates varicornis (C. L. Koch).

Latzel (1884, p. 241) gives the dimensions of this animal as 6–10 mm.

Specimens probably referable to this species were taken as follows:—logs in field, inland, Heacham, Nk.; juniors, under bark, inland, Heacham, Nk.; Mr. Witton's, inland, Heacham, Nk.

Amsteinia fusca (Am Stein).

M.-by-T. dist., Lns.; Mr. Witton's yard, Heacham, Nk.; logs in field, inland, Heacham, Nk.

Blaniulus guttulatus (Bosc).

Female only (males are necessary for certain diagnosis), M.-by-T. dist., Lns.

Polydesmus coriaceus, Porat.

One male, two females (determined, as were most of our M.-by-T. dist. specimens, soon after collection, by our friend Dr. A. Randell Jackson, of Chester), M.-by-T. dist., Lns.

Polydesmus complanatus (Linné).

Messrs. Chilvers and Sons' nurseries, Heacham, Nk.

Brachydesmus superus mosellanus (Verhoeff).

Garden, Heacham, Nk. (dissected for confirmation); Ringstead Downs, Nk.

Ophiodesmus albonanus (Latzel).

Garden, Heacham, Nk. (dissected for confirmation).

Macrosternodesmus palicola, Brölemann.

Garden, Heacham, Nk. (dissected for confirmation).

Polymicrodon polydesmoides (Leach).

Syn. *P. latzeli* (Verhoeff).

The genus common, Harlaxton and Ruskington, Lns., *J. C. V.-S.*; under flints in chalk-hole near the sea, Wells-on-Sea, Nk., *St. J. M.*, ix. 1918; garden, juniors only, Heacham, Nk.; ? (junior), Ringstead Downs, Nk.

As no other species of this genus is known to occur in Britain, it is assumed that all the specimens recorded belong to Leach's form.

Brachychæteuma bradeæ (Brölemann and Brade-Birks).

A full description of this animal is given in the seventh paper of this series (Brade-Birks, Dec. 1917).

We took five specimens referable to the genus *Brachychæteuma* in Messrs. Chilvers and Sons' nurseries, Heacham, Nk., under boxes on fairly hard ground. Dissection of the male proved that *B. bradeæ* was present, but upon the dissection of a female it was found that the vulvæ were apparently identical with those of the type of *B. quartum*, Brade-Birks (Oct. 1918); this seems to throw doubt upon the validity of *quartum*, but we must await the discovery of more material from the Bakewell district of Derbyshire to confirm or dispel this suspicion.

Polyxenus lagurus (Linné).

Latzel (1884, p. 74) gives the length of this species as 2·5–3·2 mm. It was recorded by Stainforth (1919) from Barton-on-Humber, where it occurred in some abundance on the 10th May and 15th June, 1919, on the ends and sides of the squared beams forming a very low parapet to the culverts that cross the ditches in Dam Road not far from the Humber shore.

Class CHILOPODA.

Monotarsobius duboscqui (Brölemann).

Under bark, Heacham, Nk.; garden, Heacham, Nk.; farm precincts, inland, Heacham, Nk.; under stone near Sandringham, Nk.

Monotarsobius crassipes (L. Koch).

Harlaxton, Lns., *J. C. V.-S.*; several, outskirts of wood, between North Wooton station and Castle Rising, Nk.; ? Messrs. Chilvers and Sons' nurseries, Heacham, Nk.; ? Snettisham, Nk.

Lithobius melanops, Newport.

Logs in field, inland, Heacham, Nk.; ? (juniors), under bark, inland, Heacham, Nk.; ? Mr. Witton's, inland, Heacham, Nk.

Lithobius forficatus (Linné).

M.-by-T. dist., Lns.; two juniors, under bark, inland, Heacham, Nk.; junior, North Wooton, Nk.

Cryptops hortensis, Leach.

Harlaxton, Lns., *J. C. V.-S.*; Mr. Witton's, inland, Heacham, Nk.

Geophilus carpophagus, Leach.

A male with fifty-three pairs of legs, under bark on fallen timber, Heacham, Nk. (This specimen was quite brilliantly luminous on the hand at night.)

Reference has already been made to the occurrence of luminous centipedes at Heacham (Brade-Birks, 1920).

Geophilus longicornis, Leach.

One male, two females, M.-by-T. dist., Lns.; garden, Heacham, Nk.; ? (juniors), Snettisham, Nk.; under stones, Castle Rising, Nk.

Geophilus electricus (Linné).

Stainforth (1919) says: "The late W. D. Roebuck writes in his 'Presidential Address to the Lincolnshire Naturalists' Union, 1910' [Lincs. N. U. Trans. 1910, p. 169], 'of the Myriopoda . . . . we appear only to have one single note, one by Mr. F. M. Burton of *Scolopendra electrica* in 1851 at Lincoln.' I cannot find that any further records of Millipedes or Centipedes have been made since 1910."

Of course, such a record hardly seems conclusive.

Stigmatogaster subterraneus (Shaw).

Harlaxton, Lns., *J. C. V.-S.*

Schendyla nemorensis (C. L. Koch).

The dimensions given by Latzel (1881, p. 198) for this species are: length 14–28 mm., breadth 0·7–1·0 mm.

Doubtful specimens only, Heacham, Nk.

Scolioplanes maritimus (Leach).

Sea-cliff, under chalk-blocks, Hunstanton, Nk., *St. J. M.*, 23. ix. 18; shore, about line of highest tides, Heacham, Nk.

Scolioplanes acuminatus (Leach).

Harlaxton, Lns., *J. C. V.-S.*; three examples, M.-by-T. dist., Lns.

Scolioplanes crassipes (C. L. Koch).

Latzel (1881, p. 194) gives for the length of this species 22–56 mm.

M.-by-T. dist., Lns.

Class SYMPHYLA.

(The following records are given on the authority of Mr. R. S. Bagnall, F.L.S., who has been kind enough to examine our own material and to supply us with the other data here presented.)

Scutigerella spinipes, Bagnall.

Two poor and somewhat doubtful examples, South Ferriby, Lns., *T. S.*, 16. x. 15; one example, almost certainly referable to this species, dry ditch in garden, Heacham, Nk., 12. vi. 19.

Scutigerella biscutata, Bagnall.

A few, South Ferriby, Lns., *T. S.*, 16. x. 15.

Symphylella vulgaris (Hansen).

One poor example, South Ferriby, Lns., *T. S.*, 16. x. 15; two examples, dry ditch in garden, Heacham, Nk., 12. vi. 19.

Symphylella horrida (Bagnall).

One example, garden, Heacham, Nk.

III. POINTS OF SPECIAL INTEREST, ETC.

The discovery of *Brachychæteuma bradeæ* in Norfolk is important from a distributional point of view, and the occurrence of luminous centipedes in the same county is not without interest.

Our knowledge of the "myriapod" fauna of Lincolnshire and Norfolk is still too incomplete for a profitable examination into the influence of such local factors as geology, altitude, vegetation, and rainfall.

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16 Bank Street,
Darwen, Lancashire,
2nd September, 1920.

LV.—*A new Termite from Mesopotamia.*

By Prof. F. Silvestri.

[Plate XX.]

Microcerotermes diversus, sp. n.

Mas alatus. Corpus (in alcool) pallide ochroleucum capite et pronoto fulvo-ochraceis, alis hyalinis nervulis majoribus pallide fulvescentibus.

Caput 1/7 longius quam inter oculos latius, supra setis brevibus et brevioribus sat numerosis instructum, fenestra haud distincta, clypeo sat inflato, ejusdem dimidia parte æque longa atque lata, superficie setis 5 et setis nonnullis brevioribus instructa; ocellis ab oculis spatio ocelli longitudinem æquanti remotis; oculis bene convexis, antennis 14-articulatis, articulo tertio quam secundo c. 2/3 breviore et quam quarto aliquantum breviore, mandibulis vide Pl. XX. figs. 3 & 4.

Pronotum quam caput cum oculis c. 1/6 minus latum, postice parum sinuatum supra setis numerosis brevioribus et brevibus instructum; mesonotum et metanotum lateribus aliquantum convergentibus postice angulatim aliquantum sinuata.

Alæ superficie setis numerosis brevioribus sparsis et articulis minimis crebris basi 3-radiata vestitæ, venis vide Pl. XX. figs. 6, 7.

Pedes setosi, secundi paris tibiis præter calcaria ad apicem anticum externe setis duabus subspiniformibus instructis.

Abdominis tergita et sternita setis brevibus et brevioribus numerosis instructa. Cerci breviores, bene setosi.

Long. corp. cum alis 8·5, sine alis 4·5; long. capitis 0·91, ejusdem lat. inter oculos 0·78, diametros long. oculi 0·25, long. antennarum 1·43, alæ anticæ 6·6, ejusdem lat. 1·6, long. tibiæ III. 0·92.

Exempla nonnulla alata libera lecta parum majora sunt; feminæ long. corp. cum alis 10, sine alis 5·2; long. alæ anticæ 8.

Miles major. Corpus cremeum capite ochraceum antice fulvo ferrugineo, mandibulis nigris.

Caput subrectangulare angulis posticis rotundatis, angulis anticis paullum convergentibus supra setis sparsis brevibus parce numerosis instructum, c. 1/4 longius quam latius, labro brevi, c. 2/9 ad basim latiore quam longiore antice parum rotundato; antennis 13-articulatis articulo tertio quam secundo aliquantum et quam quarto parum breviore; mandibulis quam capitis latitudine parum longioribus, parte distali aliquantum orcuta, margine interno irregulariter et parum profunde serrulato.

Pronotum quam capitis latitudo fere 1/3 minus latum, lobo antico margine medio parum sinuato, margine postico subrecto, lateribus rotundatis, superficie setis brevibus et brevioribus nonnullis instructa; mesonoti et metanoti margine postico vix sinuato.

Pedes parce setosi, tibiæ secundi paris spinis externis præapicalibus robustis.

Abdominis tergita et sternita setis nonnullis brevibus præsertim posticis et setis brevioribus et brevissimis instructa. Cerci breviores.

Long. corp. mm. 5, long. capitis 1·40, ejusdem lat. 0·90, long. antennarum 1·30, mandibularum 1·00, tibiæ III. 0·78.

Miles minor. Long. corp. mm. 4, long. capitis 1·24, ejusdem lat. 0·85, long. antennarum 1·30, mandibularum 0·92, tibiæ III. 0·75.

Operarius. Corpus cremeum capite ochroleuco.

Caput subæque longum atque latum supra setis brevioribus et brevibus sat numerosis instructum, clypeo sat inflato, utrinque seta mediana et seta antica brevibus et setis nonnullis brevioribus instructo, antennis 13-articulatis, articulo tertio quam secundo dimidio vel plus breviore et quam quarto aliquantum breviore.

Thorax et abdomen eisdem militis similes.

Long. corp. mm. 3·2, long. capitis 0·85, antennarum 0·90, tibiæ III. 0·60.

Habitat. Exemplum alatum et exempla nonnulla alia clar. P. A. Buxton ad Amara (Tigris fl., Mesopotamia) sub arborum cortice (2/i./1918) legit exempla alata parum majora etiam ad Amara (24/iv./1918) legit.

Observatio. Species hæc alatorum colore inter ceteras mihi notas diversa est et etiam militis forma.

[NOTE.—The species which Prof. Silvestri describes above is common at Amara in Lower Mesopotamia. It makes colonies under the bark of dead trees, especially apricot-trees. The colonies are always small, and I never found any termitophiles in them. The winged adults come to light.—P. A. BUXTON.]

EXPLICATIO FIGURARUM (PLATE XX.).

Fig. 1. Maris caput supra inspectum.
Fig. 2. Idem lateraliter inspectum et antrorsum aliquantum inclinatum.
Fig. 3 et 4. Ejusdem mandibulæ supra inspectæ.
Fig. 5. Ejusdem thoracis tergita.
Fig. 6–7. Alæ.
Fig. 8. Alæ particula multo ampliata.
Fig. 9. Maris tibia secundi paris.
Fig. 10. Ejusdem pes tertii paris a tibiæ apex.
Fig. 11. Militis caput pronum.
Fig. 12. Ejusdem labrum magis ampliatum.

LVI.—*A new Termitophilous Collembolan from West Africa.*

By JAMES MEIKLE BROWN, B.Sc., F.L.S., F.E.S.

AMONGST a quantity of Apterygota material very kindly forwarded to me for determination by Mr. P. A. Buxton, F.E.S., of Cambridge, was a tube containing six specimens of a species of *Cyphoderus* obtained in a nest of termites in Sierra Leone. As the species proves to be new, it is described in the present paper.

Cyphoderus buxtoni, sp. n.

Abdomen IV. about 2½ times the length of abdomen III. Antenna 1½ times the length of the head. Proportional lengths of the antennal segments approximately as 1 : 3 : 2 : 4. Eyes absent.

Tenent-hair of foot distinctly clubbed and not quite as long as the claw. Claw of foot ⅔ the length of the mucro of the spring, with a small indistinct inner tooth about the middle of the margin, in addition to the usual pair of large basal teeth.

Empodial appendage ("lower claw") about ⅔ the length of the claw, with a large broad outer tooth (fig. 1).

Dentes of spring each with two rows of ribbed dorsal scales, five inner and seven outer, of which the distal outer scale projects slightly beyond the apex of the mucro, and the distal inner scale is nearly twice the length of the mucro (fig. 2). Manubrium 1½ times the length of the dens; dens 3⅓ times that of the mucro. Mucro with slightly curved ventral edge, and, in addition to the small apical tooth, with three dorsal teeth, the two more distal ones approximately equal and in the distal third of the mucro, the third small and placed about ⅓ from the base of the mucro (fig. 3).

Colour white.

Size 1·2 mm.

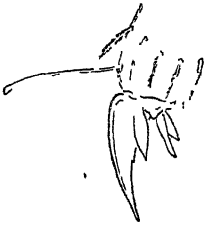
In the nest of termites (see below), Sierra Leone, West Africa (*P. A. Buxton*, 19. vi. 1917).

Types in the British Museum (South Kensington).

Cyphoderus buxtoni differs from most of the described members of the genus in having seven outer dorsal dental scales, the usual number being six (Borner, 1913). The fork (spring) of one specimen was abnormal, the right dens carrying eight outer dorsal scales and the corresponding mucro having no small basal tooth; the left dens and mucro were normal.

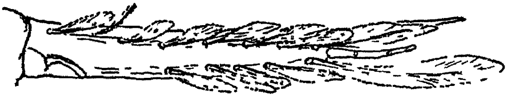
A noteworthy feature is the presence of three dorsal teeth to the mucro. This character occurs in two species described by Wahlgren from Egypt, namely, *C. arcuatus* and *C. termitum*. From *C. arcuatus* our species differs, among other characters, not only in the general form of the mucro, but in the relative length of the last dental scales and in the proportional lengths of the abdominal segments, and from

Fig. 1.



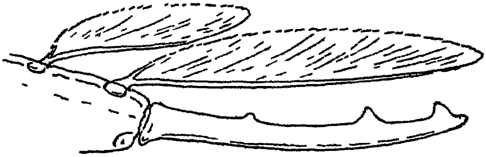
Cyphoderus buxtoni, sp. n. Foot, × 1200.

Fig. 2.



Cyphoderus buxtoni, sp. n. Right dens and mucro (dorsal view), × 530.

Fig. 3.



Cyphoderus buxtoni, sp. n. Right mucro, with last two outer dental scales (side view), × 1800.

C. termitum in the form of the mucro, but especially in the structure of the claw (Wahlgren, 1906).

Species of *Cyphoderus* have been described from various parts of the world, and in nearly all cases living in association with either ants or termites. In our own country the only known species—*C. albinos*, Nic.—frequently occurs in ants' nests. An exception, however, appears to be in *C. genneseræ*, Carp., described from Galilee, where it was discovered living under stones in a salt-spring (Carpenter, 1913).

Appended are some notes relating to the occurrence of *C. buxtoni* kindly supplied by Mr. Buxton, to whom my thanks are due for giving me the opportunity of examining the material:—

"Freetown, Sierra Leone, 19. vi. 1917.

"*Cyphoderus* collected from a termites' nest, in which they occurred in great numbers. The nest was a hard mud turret 18 inches high on the golf-course, and had been made apparently by *Eutermes suspensus*, Silv., which inhabited it in immense numbers. The nest also contained right in its middle a colony of *Pericapritermes urgens*, Silv., workers, soldiers, and winged sexual forms, and a few *Basidentitermes potens*, Silv., of which I only secured nasutes. The termites have been named by Prof. Silvestri."

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LVII.—*On some new Forms of Lichens.*

By Prof. Dr. C. MERESCHKOVSKY.

Physcia pulverulenta (Scheb.), Nyl., forma *delicata*, Mer.

Thallus mediocris, *pallide ochroleuco-cinereus*, nudus vel vix pulverulentus, laciniis quasi ut in typo, sed minoribus, tenuioribus. *concretis*, marginibus subcrenulatis, centro ad margines *lobulis microphyllinis* munitis. Apothecia *mediocria*, vulgo 1·4–1·8 millim., 2·6 haud superantes, marginibus tenuibus, sæpe foliosis.—Corticola, supra quercus.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabulæ *Physciæ pulverulentæ*).

Loc. Geneva (Helvetia).

Physcia pulverulenta, forma *turgidula*, Mer.

Thallus expansus, cæsio-pruinosus, verruculosus, formam *turgidam* (Schær.), Harm., in memoriam revocans, sed *verrucis subsquamuliformibus*, minus aduatis, imbricatis. Supra juglandem.

Rappelle, par la couleur et la pulvérulescence bleuâtre des squamules dont le thalle entier est couvert, la forma *turgida* (Schær.), Harmand, mais en diffère par le développement des squamules qui ici ont l'aspect de lobes imbriqués, tandisque dans la forma *turgida* elles sont plus courtes, plus appliquées au thalle, ayant l'aspect plutôt de tubercules que de lobes ou squamules. Il serait mieux peut-être d'en faire une forme de la var. *imbricata* ; en l'absence de mes collections, restées en Russie, je ne suis pas à même de décider cette question.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabulæ *Physciæ pulverulentæ*).

Loc. Geneva, Hort. botan. (Helvetia).

Physcia pulverulenta, var. *lepidota*, Mer.

Thallus *nudus*, griseo-plumbeo-olivaceus, centro *squamulis* numerosis *minutis*, 0·2–0·3 millim. latis obsitus. Apothecia marginibus tumidis, rugoso-granulosis foliosisque. Supra corticem juglandis.

Thalle assez grand, nu (très rarement des traces de pulvérulescence aux extrémités des laciniures), gris plombé olivacé (pas brun comme dans la var. *venusta*), laciniures assez larges, rapprochées, divisées comme dans le type, extrémités finement crénelées-découpées ; centre du thalle couvert de très petits lobules en forme d'écailles, environ de 0·2 à 0·3 millim. en diamètre, rappelant souvent les squamules du *Peltigera lepidophora*, parfois aux bords crénelés. Apothécies élevées, noires, à disque plus ou moins pruineux ou nu, mat, bord épais, rugueux-granuleux, orné au pourtour de lobes thallins comme dans la var. *venusta* et parfois aussi des mêmes petites écailles qui recouvrent le centre du thalle.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabulæ *Physciæ pulverulentæ*).

Loc. Geneva, Hort. botan. (Helvetia).

Physcia pulverulenta, var. *aquiloides*, Mer.

Thallus mediocris, sordide- vel obscure-cervinus, *nudus*, laciniis elongatis, *angustis*, 0·5–1 millim. latis, linearibus, dichotomice divisis, *discretis*, nudis, subrugosis, *valde convexis* ; centro *granulosus* vel minute verruculosus. Apothecia circiter 1·5 millim.

lata (1·8 millim. haud superantes), rufo-fusca, nuda vel pruinosa, foliolis destituta. Supra corticem castaneæ.

Spec. orig. In herb. Conservatorii botanici Genevæ (vide Tabulæ *Physciæ pulverulentæ*).
Loc. Lugano-Vezia (Helvetia italica).

Physcia pulverulenta, var. *angustata* (Hoffm.), Nyl., forma *convexa*, Mer.

Thallus fuscus vel obscuro-fuscus, nudus, lævis, laciniis *subconvexis*, centro lævis, haud granulosus. Ad corticem populi.

C'est la forma *nuda*, Mer. (Hedwigia, 1919, p. 230), à laciniures un peu, mais constamment, convexes; dans la forma *nuda* les laciniures sont planes ou même un peu concaves, jamais convexes; ici elles sont toujours plus ou moins convexes ce qui rapproche cette forme de la var. *aquiloides*, où cependant le centre du thalle est granuleux, la surface du thalle rugueuse et les laciniures plus convexes. Ici le centre du thalle est tout aussi lisse et uni qu'à la périphérie. La couleur du thalle brun foncé, par place même un peu noirâtre, est aussi très différente de celle de la var. *aquiloides*.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabulæ *Physciæ pulverulentæ*).
Loc. Prope Lugano (Helvetia italica).

Physcia pulverulenta, forma *elegantella*, Mer.

Thallus mediocris, fusco-cinereus, peripherium versus lætior, pallide-cervinus, nudus, laciniis *angustis* (circiter 0·4 millim. vel minus latis), *linearibus*, planis, dichotomice vel palmatim divisis, discretis, laciniolis terminalibus subpulverulentis. Apothecia *parva*, circiter 0·6 millim. lata (vel minores); pruinosa, margine tenui, lobulis haud munita. Ad corticem castaneæ.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabulæ *Physciæ pulverulentæ*).
Loc. Lugano-Vezia (Helvetia italica).

En réunissant ces formes avec toutes celles que j'ai décrites ailleurs et en y ajoutant quelques-unes des formes européennes décrites par d'autres auteurs, on obtient le système suivant du *Physcia pulverulenta* :—

1. *Physcia pulverulenta* (Schreb.), Nyl.
2. —— ——, forma *delicata*, Mer.
3. —— ——, forma *granulosa*, Mer. (Hedw. 1919, p. 227).
4. —— —— ——, subforma *fruticulosa*, Mer. (Hedw. 1919, p. 228).

5. *Physcia pulverulenta*, forma *polita*, Flot.
6. —— ——, forma *rugosa*, Mer. (Hedw. 1919, p. 229).
7. —— ——, forma *subvenusta* (Nyl.).
8. —— ——, forma *turgida* (Schaer.), Harm.
9. —— ——, forma *turgidula*, Mer.
10. —— ——, forma *venustoides*, Mer. (Hedw. 1919, p. 229).
11. —— ——, var. *angustata* (Hoffm.), Ach.
12. —— —— ——, forma *convexa*, Mer.
13. —— —— ——, forma *elegantella*, Mer.
14. —— —— ——, forma *nigricans*, Mull. Arg. (Classif.).
15. —— —— ——, forma *nuda*, Mer. (Hedw. 1919, p. 230).
16. —— ——, var. *aquiloides*, Mer.
17. —— ——, var. *argyphæa*, Ach.
18. —— —— ——, forma *centrofusca*, Mer. (Hedw. 1919, p. 230).
19. —— —— ——, forma *granulata*, Mer. (Hedw. 1919, p. 231).
20. —— ——, var. *imbricata*, B. de Lesd.
21. —— —— ——, forma *microphyllina*, Mer. (Hedw. 1919, p. 231).
22. —— ——, var. *lepidota*, Mer.
23. —— ——, var. *rufescens*, Mer. (Hedw. 1919, p. 231).
24. —— ——, var. *subpapillosa*, Cromb. Brit. Lich. i.
25. —— ——, var. *venusta* (Ach.).

Physcia virella (Ach.), Mer., forma *dendrilobata*, Mer.

Thallus rosulas elegantes formans, laciniis tenuibus, circiter 0·4 millim. latis, elongatis, *dendritico-* (interdum pinnato-) *ramosis, discretis*, soraliis *minutissimis*. Supra corticem fraxini.

Spec. orig. in herb. Conservatorii botanici Genovæ (vide Tabula *Physciæ virellæ*).

Loc. Lugano, via Tesserete (Helvetia italica).

Physcia virella (Ach.), Mer., forma *dendrilobata*, Mer., subforma *tenerrima*, Mer.

Laciniis *tenuissimis*, 0·2 millim. latitudine haud superantibus, sæpe minoribus. Ad corticem fraxini.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabula *Physciæ virellæ*).

Loc. Lugano, via Tesserete (Helvetia italica).

Physcia hispida (Schreb.), Elenk., forma *auriculata*, Mer.

Thallus subtus albus, laciniis usque ad 2 millim. latis, *auriculato-cucullatis*, rhizinis paucis albidis. Ad ligna, loco aperto.

Spec. orig. in herb. Conservatorii botanici Genevæ.

Loc. Lugano (Helvetia italica).

Squamaria muralis (Schreb.), Elenk., forma *convexiuscula*, Mer.

Thallus ut in typo, sed apotheciis *livido-stramineis*, *convexis*, marginibus *nullis vel vix ullis*. Ad saxa duriores.

Forme curieuse dans laquelle les compartiments ou aréoles du centre du thalle sont tous transformés en apothécies livides-verdâtres, qui souvent prennent ou plutôt conservent la forme anguleuse des aréoles.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabula *Squamariæ muralis*).

Loc. Lugano-Pregassona (Helvetia italica).

Squamaria muralis (Schreb.), Elenk., forma *granulata*, Mer.

Thallus *stramineo-albescens*, e *granulis squamiformibus minutis*, circiter 0·2–0·5 millim. latis, planiusculis compositus, ambitu passim lobis abbreviatis. Apothecia *minutissima*, 0·5 millim., haud superantes, concava. Ad saxa micaçeo-schistosa.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabula *Squamariæ muralis*).

Loc. Lugano-Pregassona (Helvetia italica).

Squamaria muralis (Schreb.), Elenk., var. *flexuosa*, Mer.

Thallus *crassiusculus*, laciniis *flexuosis*, mutuo pressione elevatis. Apothecia elevata, flexuosa vel subflexuosa, disco plano, margine bene evoluto. Ad tegulas.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabula *Squamariæ muralis*).

Loc. Chili, legit Montagne.

Parmelia conspersa (Ehrh.), Ach., forma *dispersa*, Mer.

Thallus colore ut in forma typica speciei (glaucescente-virescente), sed laciniis passim nonnihil magis dissicatis *dispersisque*, rosulas haud formantibus. Ad saxa micaceo-schistosa.

La couleur du thalle est ici plutôt un peu bleuâtre (comme dans le type) que jaunâtre, comme elle l'est dans ma forma *ochroleuca*, Mer. Les laciniures, par places plus finement découpées que dans le type, rapprochent un peu cette forme de la var. *digitulata*, Nyl., quoique cependant la forma *dispersa* soit bien différente sous tous les autres rapports.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabula *Parmeliæ conspersæ*).

Loc. Lugano-Savosa (Helvetia italica).

Parmelia conspersa (Ehrh.), Ach., var. *diffracta*, Mer.

Thallus arcte adnatus, *areolato-diffractus*, areolis minutis, circiter 0·5–0·7 millim. latis, *convexis*, concretis, laciniis in peripherio vix ullis. Apothecia quasi ut in typo. Ad saxa duriores.

Spec. orig. in herb. Conservatorii botanici Genevæ (vide Tabula *Parmeliæ conspersæ*).

Loc. Southern Colorado, U.S. America.

Parmelia conspersa (Ehrh.), Ach., var. *digitulata*, Nyl., forma *intermedia*, Mer.

Thallus isidiis haud instructus vel vix ullis, laciniis superficialibus minus evolutis et periphericis partim latioribus, ut in forma typica speciei, partim tenuioribus, ut in var. *digitulata*. Ad saxa duriores.

Forme intermédiaire entre cette variété et l'espèce type. Je l'ai si souvent rencontrée en France (Docelles, Vosges) et en Suisse (Lugano) que j'ai la conviction que nous avons là une unité systématique distincte.

Spec. orig. (1) in herb. C. Mereschkovsky, Kazani, e Gallia (Docelles), sub alt. nomine asservat., (2) in herb. Conservatorii botanici Genevæ (e Lugano).

Loc. Gallia: Docelles (Vosges); Helvetia italica (Lugano).

Parmelia conspersa (Ehrh.), Ach., var. *isidiata* (Anzi), Mer., forma *heteroclyta*, Mer.

Thallus glaucescenti-virescens (ut in typo speciei), centro isidiis, ut in var. *isidiata* et lobulis tenuiter dissectis, ut in var. *digitulata*, intermixtis. Ad saxa granitica.

C'est une espèce d' "hybride" des deux variétés. J'ai trouvé cette forme dans une localité de Lugano (Massagno) sur un mur en pierres granitiques à l'état pur et en si grande quantité (on aurait pu en avoir pour 25 parts identiques) que pour moi il n'y a pas de doute que ce ne soit une unité systématique distincte.

Spec. orig. (1) in herb. Conservatorii botanici Genevæ (vide Tabula *Parmeliæ conspersæ*), (2) in herb. Londini (Brit. Mus.), (3) in herb. Parisii (Muséum), (4) in herb. Cambridge, Harv. Univ. (U.S. Am.), (5) in herb. Univ. Upsalæ.

Loc. Lugano-Massagno (Helvetia italica).

Le *Parmelia conspersa* est aussi très riche en formes et variétés. En voici une liste qui est loin d'être complète :—

1. *Parmelia conspersa* (Ehrh.), Ach. Voir pour le type la Tabula du Conserv. botan. d. Genève contenant cette espèce.
2. —— ——, forma *dispersa*, Mer.
3. —— ——, forma *hypoclista* (Nyl.), Mer.
4. —— ——, forma *imbricata* (Mass.), Mer. (Massal. Lich. it. exs. p. 167).
5. —— ——, forma *ochroleuca*, Mer. (Additam. ad Lich. Ross. ii. Annuaire d. Conserv. et Jard. bot. d. Gen. vol. xxii.).
6. —— ——, forma *vaga*, Mer. (Bull. Soc. bot. Genève, 1918, p. 26).
7. —— ——, forma *vaga magna*, Mer. (Bull. Soc. bot. Genève, 1918, p. 34).
8. —— ——, var. *digitulata*, Nyl. (Mereschk. Lich. Crim.).
9. —— —— ——, forma *intermedia*, Mer.
10. —— ——, var. *isidiata* (Anzi), Mer.
11. —— —— ——, forma *heteroclyta*, Mer.
12. —— —— ——, forma *lusitana* (Nyl.), Harm.
13. —— ——, var. *stenophylla*, Ach.
14. —— —— ——, forma *georgiana*, Ach.
15. —— ——, var. *subconspersa* (Nyl.), Oliv.
16. —— ——, var. *verrucigera* (Nyl.), Harm.

Anaptychia ciliaris (L.), Koerb., forma *helianthus*, Mer.

Apothecia 3–5 millim. lata, cæsio-pruinosa, margine laciniis thallinis *1–1·5 millim. longis* (vel minoribus) et circiter 0·3–0·4 millim. latis, sæpe *linearibus*, canaliculatis, simplicibus vel passim subdivisis, convexis. Ad corticem arborum.

Les lobes plus courts et souvent entiers distinguent cette forme de la forma *actinota* en donnant aux apothécies, par la régularité de la disposition des lobes, l'aspect d'une fleur de tournesole.

Spec. orig. in herb. Conservatorii botanici Genevæ.

Loc. Canton Genève, Cointrin, leg. J. Rome, 1882 (Helvetia).

Anaptychia ciliaris (L.), Koerb., forma *submarginata*, Mer.

Apothecia 4–7 millim. lata, nuda vel leviter pruinosa, vel cæsio-pruinosa, margine *tenui*, circiter 0·2–0·3 (vel rarius 0·4) millim. crasso, integro vel leviter crenulato, interdum *subevanescente*. Ad corticem arborum.

Le peu de développement du rebord thallin des apothécies est le caractéristique de cette forme.

Spec. orig. in herb. Conservatorii botanici Genevæ.

Loc. Vevey (Canton Vaud, Helvetia), legit Cavin; Voirons prope Geneva (Helvetia), leg. J. Rome; Italia, in provincia Veronensi (leg. Massalongo); Gallia: Rambovillers.

Cetraria hiascens (Fr.), Th. Fr., forma *delicatula*, Mer.

Syn. *Cetraria Delisei*, Bor. in Norrlin et Nylander, Herb. Lich. Fenn. no. 108 *a*.

Thallus laciniis præcipue apicem versus *tenuioribus* (0·5 millim. latit. et sæpe minus), obscurior fuscescens. Supra terram in sphagneto.

Loc. Fennia: Tavastia (Rossia).

Caloplaca teicholyta (Ach.), forma *nivalis*, Mer.

Thallus *albus*. Ad saxa duriores supra muros.

Diffère du type qui a toujours le thalle un peu grisâtre par la couleur d'un blanc de neige de son thalle. Sur un mur en pierres dures, côté du nord.

Spec. orig. in herb. Conservatorii botanici Genevæ.

Loc. Veyzier, prope Geneva.

Dermatocarpon aquaticum, Weiss., var. *nervosum*, Mer.

Thallus subtus niger vel fusco-nigrescens, *reticulato-nervosus*.

Une nervure très proéminente imitant, à s'y méprendre, la nervure typique des plantes dicotylédonées, avec la distinction nette des nervures principales et secondaires, recouvre la face inférieure du thalle qui est toujours très foncée, ordinairement noire.

Spec. orig. in herb. Conservatorii botanici Genevæ.

Loc. Lacus Blantsin (Helvetia).

Biatora kreyeri, Mer.

C'est le lichen qui a été décrit par Kreyer (" Contributio ad fl. lichen. gub. Mohilevensis," Acta Horti Petropolit. 1913, p. 338) sous le nom de *Biatora areolata*, Kreyer (nomen jam ante adhibitum).

Spec. orig. in herb. cryptog. Horti Petropolit.

Loc. Rossia, gubern. Mohilev.

Un nombre considérable de nouvelles espèces, variétés et formes ont été récemment décrites dans mon ouvrage " Schedulæ ad Lichenes ticinenses exsiccatos " in ' Annuaire du Conservatoire et du Jardin botaniques de Genève,' vol. xxi. 1919, pp. 145–216. Prière d'effacer à la p. 207 la var. *arenicola*, Mer., de l'*Omphalaria pulvinata* qui n'est que le *Pyrenopsis pulvinata*, Harmand, Lich. de France, p. 41 (syn. *Pyrenopsis hæmalea*, Nyl.).

BIBLIOGRAPHICAL NOTICES.

A Handbook of British Mosquitoes. By WILLIAM DICKSON LANG. Pp. 125 & pls. i.–v. London: printed by Order of the Trustees of the British Museum. 1920.

THIS Handbook gives an account of the twenty-one species of mosquito inhabiting the British Islands, illustrated by 132 excellent text-figures and 5 coloured plates; the latter represent the females of *Anopheles maculipennis* (the common malaria-conveying mosquito of Europe), *bifurcatus*, and *plumbeus*, and *Ochlerotatus caspius* and *nemorosus*. Nine genera are enumerated, and the earlier stages, as well as the imago, of most of the species are described and figured in detail. *A. maculipennis*, it may be observed, is stated to be abundant in Britain, wherever breeding conditions are suitable, and the larva has even been found in brackish-water dykes on the coast of Kent.

The price charged for the Handbook is unfortunately high, due to the great cost of illustrations and printing at the present time, and this may to some extent restrict the sale of a very useful publication.

Barbados-Antigua Expedition.—Narrative and Preliminary Report of a Zoological Expedition from the University of Iowa to the Lesser Antilles under the auspices of the Graduate College. By Prof. C. C. NUTTING. *University of Iowa Studies in Natural History.* Vol. VIII. No. 3. Iowa City: year of publication not given [? 1920], Preface dated May 5th, 1919. Pp. 274 & pls. 1.

THIS work, as stated in the Preface, is intended as a companion volume to the 'Narrative and Preliminary Report of the Bahama Expedition from the State University of Iowa,' published in 1895. The islands visited by the present expedition were St. Thomas, St. Croix, St. Kitts, Antigua, Dominica, and Barbados, and headquarters were made on Pelican Island, off the coast of Barbados, and English Harbour, Antigua. These Lesser Antilles were found to be a much poorer field than the Bahamas, Cuba, and the Florida Keys, and the amount of dredging that could be done in water over 100 fathoms deep was much less; hence the deep-sea novelties were by no means so conspicuous as those described in the Reports of the Bahama Expedition. Notes on the zoology, geology, and botany of Antigua are given on pp. 174–223, a few insects (Lepidoptera and Hemiptera) being mentioned by Mr. D. Stoner. The work is illustrated by a sketch-map and forty-nine extremely good photographic plates. The collections made have been placed in the hands of specialists, and doubtless will be dealt with by them in subsequent Reports.

Furniture-beetles, their Life-history, and how to check or prevent the damage caused by the Worm. By CHARLES J. GAHAN, D.Sc. British Museum (Natural History): Economic Series, No. 11. 1920.

THIS very useful illustrated pamphlet of twenty-four pages, issued at the extremely low price of 6*d.*, contains an account of the five beetles attacking furniture, and of the methods of prevention and control. The beetles are, *Anobium punctatum* (the egg, larva, imago, and sections of wood showing the holes made by the larva, are shown, either on the plate or in text-figures), *Ptilinus pectinicornis*, *Xestobium rufovillosum* (the larva of which has done so much damage to the roof of Westminster Hall), *Lyctus brunneus*, and *Lyctus linearis*, the chief culprit being *Anobium punctatum*. The methods of dealing with their attacks are grouped under three headings:—(1) Treatment by heat, (2) Fumigation with a gas or vapour, (3) Treatment by the application of a liquid.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

April 21st, 1920.—Mr. R. D. Oldham, F.R.S., President, in the Chair.

The following communication was read:—

'The Cambrian Horizons of Comley (Shropshire), and their Brachiopoda, Pteropoda, Gasteropoda, etc.' By Edgar Sterling Cobbold, F.G.S.

As the study of the Comley Cambrian fossils proceeded, it became apparent that the several faunas (sketched out in 1911 on the evidence of the trilobites[1]) and their order of appearance may prove to be of more than local interest. The Author consequently proposes names for the horizons, based on their fossil contents, to replace those used in his previous publications, which were often clumsy and only of local origin, though necessary until the fossils were better known.

Table I of the paper gives the names now proposed, together with those previously used, notes on the principal lithological characters of the beds, and such correlations as are at present possible. The Comley Sandstone Series includes beds of Lower Cambrian and Middle Cambrian age up to an equivalent of the *Paradoxides-forchammeri* Zone, and is overlain by a group of shales belonging to the Upper Cambrian.

The horizons now recognized and their possible correlations are as follows:—

Names proposed.	*Index Letter.*	*Correlation Notes.*
UPPER CAMBRIAN.		
Orusia Shale.	Ca.	*O. lenticularis* Beds, Scandinavia and North Wales.
MIDDLE CAMBRIAN.		
Billingsella Beds.	Bc.	*P. forchammeri* Zone, Scandinavia.
Paradoxides-davidis Flags.	Bb. 5.	*P. davidis* Beds, Scandinavia, North and South Wales in part. Upper *davidis* fauna, Nuneaton.

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[1] See E. S. Cobbold, Q. J. G. S. vol. lxvii, pp. 282 *et seqq.*

Names proposed.	*Index Letter.*	*Correlation Notes.*
P. rugulosus Sandstone.	Bb. 4.	Lower *davidis* fauna, Nuneaton.
Unexplored interval of no exposure.	Bb. 3.	(?) *Hartshillia* fauna, Nuneaton.
Shaly division.	Bb. 2.	*P. hicksi* Zone, Scandinavia. *P. hicksi* fauna, Nuneaton.
P. intermedius Grit.	Bb. 1.	
Dorypyge-lakei Flags.	Ba. 3.	*P. œlandicus* Zone, Scandinavia. Purley Shale, in part, Nuneaton.
A shaly group.	Ba. 2.	
P. groomi Grits.	Ba. 1.	
LOWER CAMBRIAN.		
Lapworthella Limestone.	Ad.	
Protolenus Limestone.	Ac. 5.	Purley Shale, in part, Nuneaton. *Protolenus* Zone, New Brunswick.
Strenuella Limestone	Ac. 4.	North Attleborough Beds, Massachusetts. *Callavia* Beds of Manuel's Brook (Newfoundland).
Microdiscus-bellimarginatus Limestone.	Ac. 3.	
Olenellus Limestone of Lapworth.	Ac. 2.	Camp Hill Quartzite, Nuneaton (After Lapworth.)
Callavia Sandstone.	Ac. 1.	
A sandstone division.	Ab. 4.	Tuttle Hill Quartzite, Nuneaton (after Lapworth). Hollybush Sandstone, Malvern.
Holmia Sandstone.	Ab. 3.	
A sandstone division.	Ab. 2.	
Obolella-groomi Beds.	Ab. 1.	
Wrekin Quartzite.	Aa.	Malvern Quartzite. Park Hill Quartzite, Nuneaton (after Lapworth).

After describing the brachiopoda, pteropoda, gasteropoda, and a few ostracoda, the Author supplies lists of all the fossils known to him, with the various horizons in ascending sequence, thus giving their order of appearance in the Comley area.

The first fauna to appear is one comparable with that of the Hollybush Sandstone of Malvern.

A second fauna in Horizon Ab 3 seems indicated by a species referred provisionally to *Holmia*. A third fauna, divisible into five sub-faunas, occurs in Horizons Ac 1 to Ac 5: that is, in beds associated with the *Olenellus* Limestone of Comley Quarry. The brachiopoda, etc. accentuate the divergences of the sub-faunas and include 19 hitherto undescribed species—6 of brachiopoda, 8 of pteropoda, and 5 of gasteropoda.

A fourth fauna appears in Horizon Ad. This horizon, a part of the well-known Black Limestone of Comley, marks the dividing-line between the Lower and the Middle Cambrian, and occurs again in the Wrekin district.

An unconformity cuts out any further sequence, and brings in the *Paradoxides* Beds, in which a new species of *Acrothyra* occurs.

The succeeding five faunas are indicated in the correlations given above, the evidence for the correlation of some 4 feet of beds at the top of the sandstone series of Comley with the *Paradoxides-forchammeri* Zone being supplied by seven or eight species of brachiopoda.

THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[NINTH SERIES.]

No. 36. DECEMBER 1920.

LVIII.—*Papers on Oriental* Carabidæ.—V.

By H. E. Andrewes.

Helluonini.

Genus *Macrochilus* and a new Genus.

I was hoping to deal in this paper with all the Eastern genera of this group, but there are difficulties at present in identifying the species of the genus *Omphra*, and I confine myself therefore to describing some new species of the genus *Macrochilus* and also a new genus and species.

The genus *Macrochilus* was indicated by Hope in his 'Coleopterist's Manual,' and hitherto seven Oriental species have been described. To these I am adding four new ones. I have included Bates's *M. infuscatus* in my "Catalogue of Species," but its author hardly regarded it as distinct from *M. trimaculatus*, Oliv., and I have omitted it from the "Table of Species."

In describing his *M. nigrotibialis* in 1900 (Abh. Mus. Dresd. ix. 5, p. 3), Dr. Heller gave a table of the Asiatic species of the genus, and enumerated ten of them: of these, two (*dorsalis*, Klug, and *scapularis*, Klug) are African species, one (*distactus*, Wied.) is a *Creagris*, and one (*tripustulatus*, F.) belongs to the genus *Pheropsophus*.

Very little seems to be known of the early stages and life-history of these insects, but the larva of *Creagris labrosa*, Nietn., has been described and figured by Schaum (Berl. ent. Zeit. 1864, p. 116). Mr. T. G. Sloane (whose important paper on the Helluonini in Proc. Linn. Soc. N.S.W., 1914, should be read by anyone studying the group) tells us that the species of some Australian genera (not *Macrochilus*) are found under the bark of trees, others having terrestrial habits. One South-African species of *Macrochilus*, as Father O'Neil of Salisbury informs me, has certainly been taken under bark, and both he and Mr. C. N. Barker of Durban have records showing that other species come to light in the evening. In India I have seen many examples of *M. trimaculatus*, Oliv., coming to light; my note on them reads "always at light, they fly into the room and settle at once, without any fluttering around." I have other records showing that specimens have been taken under stones and on grass.

In the species of this genus there is considerable variation in the buccal organs, the structural characters of the body being fairly constant. Thus, the ligula is generally emarginate in front, but sometimes straight (*impictus*) and sometimes arcuate (*vitalisi*). The labrum is sexsetose, but the setæ are arranged in various ways. The tooth of the mentum is sometimes glabrous, sometimes setose. The form of the palpi also varies a good deal, and the penultimate joint of the labial palpi is sometimes bisetose, sometimes plurisetose. I have made use of most of these characters in an attempt to differentiate the species.

I propose to give first a fresh description of the genus, then a catalogue of the species, followed by a dichotomic table, and, finally, descriptions of the new species. I have also added a few notes on some of the old species, which I thought might be of use.

Generic Characters.

Ligula fairly wide, deeply impressed at sides on under surface for reception of the squama palpigera, from which results a more or less well-developed longitudinal keel, which disappears or forks about middle and is succeeded by a central channel to near apex; at least one pair of setæ towards apex and sometimes others along sides of channel. *Paraglossæ* present (in all species I have dissected), rudimentary, membranous, whitish in colour, shorter than ligula and attached to it at base (generally visible only after dissection, and then from above). *Maxillæ* with a row of stout setæ on inner margin, apex smooth, hooked, and sharp. *Palpi* stout and rather short, of varying form, apical joint often dilated, penultimate joint of labials bi- or plurisetose. *Mentum* deeply emarginate, with a long slender tooth, lobes also sharp, elongate, and nearly always a little longer than tooth, base (and generally also surface) of tooth setose, epilobes narrow. *Labrum* porrect, smooth and shiny, sexsetose, generally rather pointed in front, with rounded apex. *Mandibles* short and wide, more or less toothed near base, sharp at apex, outer sides minutely setose at base, a row of setæ along and within upper margin of scrobe (in all species dissected), a longitudinal ridge running along the underside, parallel with inner margin and generally densely fringed with minute setæ. *Antennæ* reaching approximately middle of body, closely pubescent from joint 5, joint 4 more pubescent than 1–3, joints generally flattened towards apex, the apical joint longer than the preapical ones and rounded at extremity; joint 2 sometimes constricted near base; joints 5–11 with a narrow smooth median channel along the middle of each flattened side. *Head* with two supraorbital setæ, antennæ arising beneath frontal plates, eyes prominent, enclosed behind by more or less dilated genæ. *Prothorax* truncate-cordiform, middle of base produced (as in *Lebia*, though to a less extent), two tactile setæ on each side, one just before middle, the other at hind angle (owing to the general pubescence these are not always easily seen). *Elytra* with base bordered at sides only, flat, shortly pedunculate, stria 8 almost obsolete, interval 8 usually wide, 9 with a hardly interrupted row of umbilicate pores, both 8 and 9 closely and irregularly punctate, apex truncate, with a membranous margin, pygidium and generally part of propygidium uncovered (I cannot detect any specialized setæ on interval 3). Metepisterna elongate and very narrow. *Tarsi* pubescent above, joint 4 emarginate; front tarsi ♂ with four joints hardly dilated, with two rows of small scales beneath.

The whole body and its members coarsely punctate and pubescent, the only glabrous parts being the labrum, middle of front (more or less), and generally the middle of head beneath and of sterna. Wings are present.

Catalogue of Species.

MACROCHILUS, Hope, Col. Man. ii. 1838, p. 166; Schmidt-Goebel, Faun. Col. Birm. 1846, p. 64; Lacordaire, Gen. Col. 1854, p. 93; Schaum, Berl. ent. Zeit. 1863, p. 80; Chaudoir, Bull. Mosc. 1877, ii. p. 247; Sloane, Proc. Linn. Soc. N.S.W. 1914, p. 570.

Syn. *Helluo** (part), Dejean, Spec. Gen. i. 1825, p. 283.
Acanthogenius, Reiche, Ann. Soc. Ent. Fr. 1842, p. 3.

astericus (Acanthogenius), White, Ann. & Mag. Nat. Hist. xiv. 1844, p. 422; Chaud. Rev. et Mag. Zool. 1872, p. 172; Bates, Ann. Mus. Civ. Gen. 1892, p. 389; Andr. Trans. Ent. Soc. Lond. 1919, p. 180=*crucifer*, Redt. Reis. Novar., Zool. ii. 1867, Col. p. 4, t. ii. fig. 3.
Hong Kong, ? Burma, ? Assam.
bensoni, Hope=trimaculatus, Oliv.
bicolor, sp. n. S. India.
chaudoiri, Andr. Trans. Ent. Soc. Lond. 1919, p. 130=*trimaculatus*, Chaud. Rev. et Mag. Zool. 1872, p. 171; Bates, Ann. Soc. Ent. Fr. 1889, p. 280; id. Ann. Mus. Civ. Gen. 1892, p. 390.
India, Indo-China.
crucifer (Planetes), Redt.=astericus, White.
immanis, sp. n. Burma.
impictus (Helluo), Wied. Zool. Mag. ii. 1, 1823, p. 49; Dej. Spec. Gen. i. 1825, p. 287. India.
infuscatus (Acanthogenius), Bates, Ann. Mus. Civ. Gen. 1892, p. 389.
Var. of trimaculatus, Oliv. Burma.
niger, sp. n. India.
nigrotibialis, Heller, Abh. Mus. Dresd. ix. 5, 1900, p. 3. Sumatra.
quadrimaculatus (Helluo), Guér.=trimaculatus, Oliv.
quadripustulatus, Schm.-Goeb.=trimaculatus, Oliv.
trimaculatus (Carabus), Oliv. Enc. Méth., Ins. ii. 1790, p. 347, t. clxxix. fig. 11; id. Ent. iii. 35. p. 88, t. vii. fig. 85; Andr. Trans. Ent. Soc. Lond. 1919, p. 129=*Bensoni*, Hope, Col. Man. ii. 1838, p. 166, t. i. fig. 5; Bates, Ann. Mus. Civ. Gen. 1892, p. 389; Andr. Trans. Ent. Soc. Lond. 1919, pp. 176 & 202=*quadrimaculatus*, Guér. Rev. Zool. 1840, p. 38; Chaud. Rev. et Mag. Zool. 1872, p. 212=*tripustulatus*, Guér. (not Dej.), Voy. Deless. ii. 1843, p. 34=*quadripustulatus*, Schm.-Goeb. Faun. Col. Birm. 1846, p. 65=*tripustulatus*, Redt. (not Pheropsophus, F.)., Reis. Novar., Zool. ii. 1867, Col. p. 4.
India, Ceylon, Burma, Penang, Indo-China, S. China, Hong Kong.
trimaculatus (Acanthogenius), Chaud.=chaudoiri, Andr.
tripustulatus (Helluo), Dej. (not Pheropsophus, F.) Spec. Gen. i. 1825, p. 286; Chaud. Rev. et Mag. Zool. 1872, p. 212; Andr. Trans. Ent. Soc. Lond. 1919, p. 124. Java.
tripustulatus (Helluo), Guer. (not Dej.)=trimaculatus, Oliv.
tripustulatus, Redt. (not Pheropsophus, F.)=trimaculatus, Oliv.
vitalisi, sp. n. China, Borneo, Indo-China.

Table of Species.

1 (6) Labrum with setæ all placed obviously on upper surface. Colour of elytra black, with a single yellowish median spot on each.

2 (3) Front margin of clypeus without a row of fine hairs, tooth of mentum with several setæ along sides. Length 25 mm.† .... *immanis*, sp. n.

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* Names, both of genera and species, in italics are synonyms.

† The measurements given are those of an average specimen.

3 (2). Front margin of clypeus with a row of fine hairs, tooth of mentum without setæ at sides. Length 14–17 mm.

4 (5). Intervals on front half of elytra more or less smooth and shiny in middle, elytral spot transverse and almost rectangular. Length 16·5 mm. .... *niger*, sp. n.

5 (4). Intervals on front half of elytra closely punctate or rugose, elytral spot cruciform. Length 14·5 mm. .... *astericus*.

6 (1). Labrum with setæ generally on margin, the two apical ones sometimes placed beneath margin. Colour of elytra piceous.

7 (8). Labrum with intermediate seta on each side distant from margin, penultimate joint of labial palpi strongly dilated inwards, each elytron with a single median yellowish spot .... *vitalisi*, sp. n.

8 (7). Labrum with all setæ on, near, or just below margin, penultimate joint of labial palpi not strongly dilated inwards, elytra immaculate, or with two spots on each, one median and one apical.

9 (16). Front of ligula more or less emarginate, elytra spotted.

10 (11). Penultimate joint of labial palpi plurisetose, genæ sloping gently to neck, tooth of mentum with a few setiferous pores. Length 15·0 mm. .... *tripustulatus*.

11 (10). Penultimate joint of labial palpi bisetose, genæ contracted suddenly to neck. Length 9·0–15·0 mm.

12 (13). Tooth of mentum with a few setiferous pores, puncturation of elytra very irregular towards apex (at all events on even intervals), head obviously narrower than prothorax. Length 15·0 mm. .... *trimaculatus*.

13 (12). Tooth of mentum without setiferous pores, puncturation of elytra practically regular to apex, head and prothorax of approximately same width. Length 9·0 mm.

14 (15). Tibiæ testaceous .... *chaudoiri*.

15 (14). Tibiæ black .... *nigrotibialis* *.

16 (9). Front of ligula not emarginate, elytra immaculate.

17 (18). Ligula rectangular in front, wide, penultimate joint of labial palpi plurisetose, colour piceous. Length 15·0 mm. .... *impictus*.

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* I have included this species in the table, but I have not seen the type; a good many of the characters used in the table are not mentioned in the description, so that its position is a matter of hypothesis It is said, however, to be closely allied to *M. chaudoiri*.

18 (17). Ligula rounded in front, penultimate joint of labial palpi bisetose, head and prothorax red, elytra piceous, but with a faint bluish tinge. Length 6·5 mm. .... *bicolor*, sp. n.

Macrochilus immanis, sp. n.

Length 24–26 mm.; width 7·5–8·5 mm.

Black; elytra each with a large median dull orange spot, a very faint spot on the median smooth area of vertex, apex of palpi and front trochanters dull red, hind margin of ventral segments (except last one) testaceous. Body coarsely pubescent throughout (except where otherwise indicated) but shiny, pubescence at apex of tibiæ and on underside of tarsi yellow-red.

Head (4·5 mm. wide) rather flat, very coarsely punctate, neck and a small area on vertex smooth, genæ sloping gently to neck; ligula rather narrow, slightly emarginate at apex, hollowed out above with a median carina; on under surface with four or five pairs of setæ along sides of median ridge and channel; tooth of mentum bordered, shorter than side-lobes, with five setiferous pores along each side, lobes with a narrow epilobe; labial palpi small, penultimate bisetose (but with some additional minute hairs), maxillary palpi large, last joint widening gradually to apex, where it is as thick as joint 1 of antennæ; labrum with equidistant setæ, all on upper surface, nearly parallel at base, contracted to a rounded point in front, faintly depressed at sides of base; antennæ nearly reaching middle of body, joint 1 long and thick, the rest subequal, but 3, 4, and 11 are a little longer than the others.

Prothorax hardly wider than head and very little wider than long, widest at a fourth from apex, moderately convex, front angles quite rounded, sides with a fine border, rounded in front, sinuate near hind angles, which are sharp, strongly reflexed, and project a little laterally, sides of base oblique and emarginate; surface coarsely but not very closely punctate, median line very faint, but there is a depressed area surrounding it, and the transverse impressions and basal foveæ are all strongly marked.

Elytra elongate, parallel, twice as long as wide, basal area deeply depressed, forming a short peduncle, punctate-striate, intervals rather flat, a row of punctures along the sides of each stria, but these are not quite evenly disposed and become more irregular towards apex, interval 8 twice as wide as the others; orange-coloured spots placed just before middle, nearly square, covering intervals 2–7.

Underside of head and middle of meso- and metasterna more or less smooth, metepisterna exceptionally long and narrow. Fourth joint of tarsi deeply emarginate, almost bilobed—indeed, the species might be put into the genus *Creagris* quite as appropriately as into *Macrochilus*.

Burma: Taung-ngu (*G. Q. Corbett*), 2 ex. My collection.

Macrochilus niger, sp. n.

Length 16–17 mm.; width 5·5–6·0 mm.

Black, rather dull; elytra each with a median orange spot, apex of palpi reddish. Body coarsely pubescent, hairs on underside of tarsi dark brown.

Head (2·5 mm. wide) moderately convex, very coarsely punctate (except front, which has only a few punctures), neck smooth, genæ sloping gently to neck; frontal foveæ and clypeal suture strongly marked, clypeus slightly emarginate in front, with a row of small closely placed setiferous punctures; labrum with all setæ on upper surface, narrowed in front, sides parallel at base, with a short impressed longitudinal furrow on each side; labial palpi small, penultimate joint plurisetose, last joint of maxillaries elongate-triangular, slightly flattened, a little shorter than joint 1 of antennæ; antennæ hardly reaching middle of body, joint 1 longest and thickest, 2 half as long, remainder nearly equal, but 3 a little longer than the others; mandibles short and very sharp, with a rounded tooth at base; tooth of mentum nearly as long as lobes, with only one setiferous pore on each side at base, both tooth and lobes very long and sharp, epilobes well marked, with upper margin sinuate; ligula not very wide, apex faintly emarginate, deeply depressed at sides of base beneath, three setæ on each side along outer margin of median channel.

Prothorax slightly convex, transverse, hardly wider than head, half as wide again as long, widest at a fourth from apex, sides rounded in front, sinuate at some little distance from base; front angles rounded, hind angles obtuse and a little reflexed, base slightly but widely produced in middle, the sides distinctly emarginate; median line faint, transverse impressions and basal foveæ well marked, surface a little uneven, very coarsely and confluently punctate.

Elytra elongate, parallel, nearly twice as long as wide, basal area deeply depressed, shoulders square, evenly but brusquely rounded behind, border at base almost dentate over interval 6, where the depressed area commences; punctate-striate, with moderately convex intervals, flatter on disk and towards apex, a row of punctures along each stria, but this puncturation is very irregular, especially towards apex; interval 8 wider than the others and quite irregularly punctate, umbilicate punctures on 9 very irregularly disposed behind shoulder; orange-coloured spot transverse, placed just before middle, covering intervals 3–7, the colour on 5 projecting slightly both before and behind. Underside of head with only a few punctures; mesosternum smooth; metepisterna very narrow.

Closely allied to *M. astericus*, White, but with a transverse instead of a cruciform spot on the elytra. Head a good deal wider, genæ longer and more conspicuous, prothorax narrower, sides more rounded in front, more sinuate behind, sides of base more emarginate and the hind angles sharper (but the form of the hind angles is a little variable, and they are blunter in the type than in some other specimens), intervals of elytra more or less smooth and shiny in middle, at least over front half (in *M. astericus* the whole surface is punctate and sometimes even rugose in front).

Nilgiri Hills: Ouchterlony Valley, August, 3000′–3500′ " in planting pit (tea) " (*H. L. Andrewes*), 2 ex.—My collection (type).

Malabar, Coimbatore, 3 ex.—British Museum.

Bengal: Giridih; Madras: Vizagapatam; Bombay: N. Kanara, Castle Rock (*S. W. Kemp*), 3 ex.—Indian Museum.

Bengal: Pusa, 1 ex.—Pusa Agric. Res. Inst.

United Provinces: W. Dehra Dun, Jhajra (*V. S. Iyer*), 1 ex.—Forest Res. Inst.

Central Provinces: Nagpur, 1000′ (*E. A. D'Abreu*), 1 ex. —Nagpur Mus.

Macrochilus astericus, White.

Length 14·5 mm.

This species has already been described twice; it is very closely allied to *M. niger* described above, and I have already pointed out the differences which exist at the end of my description of that species.

Macrochilus vitalisi, sp. n.

Length 12·5–14·0 mm.; width 3·75 mm.

Piceous; a median spot on each elytron, labrum, joint 1 of antennæ, and femora testaceous, mouth-parts, rest of legs, and antennæ brownish.

Head (2·40 mm. wide) moderately convex, coarsely but not closely punctate, genæ large, sloping gently to neck; ligula rather small, nearly rectangular, but with front margin rounded, a pair of setæ beneath near margin, another pair further back near middle, paraglossæ about two-thirds as long as ligula; tooth and lobes of mentum long, narrow, and pointed, tooth setose on outer margin, with a few irregularly disposed setæ on surface, epilobes visible on lower half of inner side of lobes; labial palpi with penultimate joint short, strongly dilated within, bisetose on apex of dilated part, last joint cylindrical, rounded at apex, a little longer than penultimate, maxillaries stout, antepenultimate contracted at extremities, obliquely sulcate on underside; antennæ stout, joint 1=2+3, 2 to 11 approximately equal, clypeus emarginate, labrum with equidistant setæ, front and hind ones on margin, middle one at a little distance from margin.

Prothorax transverse, a little wider than head, sides moderately rounded in front, sinuate behind, hind angles right, sides of base oblique but straight, median line well marked on disk, basal foveæ deep, surface coarsely but not very closely punctate, less coarsely than head.

Elytra elongate-parallel, punctate-striate, a row of punctures on each side of striæ, which become irregular close to apex only, intervals 8 and 9 closely and irregularly punctate, testaceous spot round, covering intervals 3–7.

Superficially resembling *M. trimaculatus*, Oliv., but smaller and without the common apical spot, regular puncturation of elytra continued to near apex, prothorax narrower, genæ less sharply contracted to neck; mentum, palpi, and ligula widely different.

China, 2 ex. E. Borneo: Moorjawa, Sanga Sanga (*H. D. Jensen*), 1 ex.—British Museum.

Laos: Ban Houei, 1 ex. Tonkin: Hoabinh, 1 ex. (*R. Vitalis de Salvaza*).

The type (China) is in the British Museum.

Macrochilus tripustulatus, Dej.

Length 15·0 mm.

Chaudoir has pointed out some of the differences between this species and *M. trimaculatus*, Oliv. These consist in the larger and wider head, larger (and I may add much more gently sloping) genæ, smaller and less projecting eyes, shorter, thicker, and almost moniliform antennæ, and coarser punctuation; prothorax wider, shorter, more coarsely punctate, hind angles rather more rounded; elytra hardly differing. Joints of tarsi shorter and wider. Colour of mouth-parts, antennæ, labrum, ventral surface, and legs (except femora) darker.

I may add one or two further characters, though I have unfortunately seen only one example (in the British Museum), and consequently have not been able to dissect the buccal organs. Ligula with two setæ beneath, not far from apex; palpi much stouter than in *trimaculatus*, Oliv., but not dilated at apex, penultimate of labials plurisetose; labrum more pointed and curving downwards at apex, the two apical setæ (quite abraded in the specimen before me) evidently small, and placed close together almost on the under surface; joints 2–6 of antennæ approximately equal (rest wanting), but 3 is slightly longer than the others; tooth of mentum with a number of irregularly disposed setiferous pores.

Macrochilus trimaculatus, Oliv.

Length 15·0 mm.

This, the commonest Eastern species in the genus, has been described several times. The ligula is wide, thick, slightly emarginate at apex, hardly channelled beneath, with one or two minute setæ only on under surface. Mentum with tooth sharper and a little shorter than lobes, the tooth with some irregularly disposed setæ behind and two or three along margins near base, epilobes narrow. Maxillæ densely ciliate within. Palpi truncate at apex; labials with apical joint slightly dilated and a little longer than penultimate, which is bisetose; maxillaries with 1=3, 2 about half that length, apical joint a little dilated. Labrum rounded, a seta on each side at about middle, a smaller pair on front margin, and a minute pair just beneath margin at apex.

Macrochilus chaudoiri, Andr.

Length 10·0 mm.

In this species the surface is less closely punctate than in its allies, and the form narrower, middle of front smooth, genæ reaching neck rather abruptly, prothorax with sides of base oblique but almost straight, the median part of the body beneath almost smooth.

Ligula widened and thickened in front, emarginate, glabrous except for a pair of setæ at each side of apex beneath. Mentum with tooth a little shorter than lobes, tooth glabrous, but a seta on each side at base, epilobes very narrow. Maxillæ short, with few but strong spines along inner margin. Palpi truncate at apex; last two joints of labials about equal, penultimate bisetose, apical somewhat dilated, triangular; in the maxillaries the antepenultimate = apical, which is triangularly dilated, as in the labials, penultimate about half as long. Antennæ with joint 1 large, cylindrical = 11, 2 about half that length, the remainder increasing gradually in length to apex. Labrum rounded in front, hardly pointed, the four inner setæ very small, placed close together at apex, the middle pair being just on the under surface.

Macrochilus impictus, Wied.

Length 15·0 mm.; width 4·5 mm.

Piceous; mouth-parts (including labrum), joint 1 of antennæ, legs, and ventral surface testaceous, margin of prothorax brown. Head with front depressed, genæ large and sloping. Prothorax rather flat, sides strongly rounded in front, hind angles projecting sideways and reflexed, but not very sharp, produced part of base wide, sides emarginate. Elytra immaculate, depressed just before middle, punctures on intervals quite irregularly disposed. Proepisterna smooth, nearly impunctate. Ligula wide, rectangular, with two pairs of setæ beneath near front margin, which is straight, and another pair further back on sides of channel. Maxillæ dilated in middle and sharply contracted to apex. Palpi rather obliquely truncate at apex; labials with penultimate joint plurisetose, rather longer than apical, which is short, setose, and triangularly dilated; maxillaries setose, antepenultimate longest, apical only a little longer than penultimate, and dilated, as in labials. Mentum with narrow elongate lobes and tooth, latter but little shorter than lobes, and bearing a number of long irregularly disposed setæ, epilobes very narrow. Labrum with sides parallel at base, then rounded and bisinuate on each side of apex. Antennæ with joint 1 longest, 3 = 4 and only a little shorter than 1, 2 nearly as long as 5.

Macrochilus bicolor, sp. n.

Length 6·5 mm.; width 2·5 mm.

Testaceous; elytra piceous, with a faint bluish tinge, sides and last three segments of ventral surface brown, apex both of mandibles and labrum black. Pubescence grey and rather long.

Head (1·25 mm. wide) convex, moderately and not very closely punctate, genæ elongate, joining neck obliquely; ligula comparatively short, slightly rounded at apex; tooth of mentum very slender, as long as side-lobes; palpi small, last joint hardly dilated, sharply truncate at apex, penultimate of labials bisetose; labium narrowed in front, depressed at sides of base, apical pair of setæ very small, close together on margin; antennæ moniliform, not reaching middle of body, joint 1=11 (which is almost pointed at apex), the rest shorter and approximately equal, but 3 is a little longer and 2 a little shorter than the others.

Prothorax hardly wider than head, nearly twice as wide as long, front angles rounded, sides rounded in front, sinuate behind, and falling at right angles on base, hind angles rounded, median part of base very little produced, basal foveæ deep, surface fairly closely punctate.

Elytra rather flat, parallel, half as long again as wide, base depressed but hardly forming a peduncle, punctate-striate, stria 1 arising from an umbilicate pore, intervals a little convex, with two very irregular rows of punctures, 8 wider and irregularly punctate. Underside less closely punctate, and therefore more shiny than in allied species.

Not unlike *Creagris labrosa*, Nietn., in form, though quite different in colour, head much narrower and more convex, striæ of elytra deeper, surface more finely and more closely punctate, fourth joint of tarsi emarginate only (bilobed in *C. labrosa*).

Bombay: Belgaum district, Nov. 1886 (*R. P. Barrow*), 1 ex. My collection.

Another example, in the British Museum, taken by Doherty in Assam, Patkai Mountains, I put down with some hesitation as a variety of this species. The size is a little larger (7·0 mm. long), the colour of head and prothorax very dark red, and latter a little less contracted behind. The apical joint of the maxillary palpi is rather more dilated.

COLFAX, gen. nov.

Ligula wide, rounded and thickened in front, depressed at sides beneath, glabrous. *Paraglossæ* wanting. *Mentum* with tooth sharper and a little shorter than lobes, latter bisinuate along outer margin, a few setæ irregularly placed behind tooth, epilobes hardly perceptible. *Mandibles* short, wide, with a large rectangular tooth at about middle, between which and apex the edge is emarginate, without setæ in scrobe or at base. *Maxillæ* short, straight, setose on inner side to apex, which is slightly contracted. *Labial palpi* small, penultimate joint glabrous, last joint elongate-triangular, rounded at apex. *Maxillary palpi* with penultimate joint minute, very slender at base, antepenultimate hollowed out on inner side at distal extremity, as long as last joint, last-named widely dilated, securiform, narrow at base, dilated inwards to near middle, rounded at apex, outer edge curved (convex outwardly) and half as long again as inner one, angles rounded, a little hollowed out at extremity (upper surface of this joint sometimes depressed, shape varying a little as result of drying). *Labrum* transverse, almost rectangular, with front angles widely rounded, a little raised along median line, depressed at sides, a single seta on each side-margin, but a few minute additional setæ occasionally visible near margin of lower surface, including a pair close together near apex. *Legs*, and especially tarsi, more slender than in *Macrochilus*.

Other characters as in *Macrochilus*.

This new genus is proposed for a species widely spread in India and Indo-China. It is allied to *Macrochilus*, a genus in which the form of the palpi is very variable, and, were there no other differences than those presented in these organs, the new species might very well have been included in it. There are, however, other peculiarities, and one of a very unusual character. In the Helluonini the maxillæ are normally sharply hooked at apex (rarely below apex), but here they are straight and without any sign of a hook; another unusual feature is the glabrous penultimate joint of the labial palpi.

Colfax stevensi, sp. n.

Length 11·0–12·0 mm.; width 3·50–3·75 mm.

Piceous black; elytra each with a median and apical yellowish spot, front margin of clypeus, a spot on vertex between eyes, side-margins of prothorax, legs, labrum, and palpi testaceous red, antennæ brown, pubescence yellow.

Head (2·0 mm. wide) convex behind, rather flat in front, closely punctate, clypeus with only a few punctures in middle, genæ short, joining neck rather abruptly; antennæ stout, hardly reaching middle of body, joint 1 cylindrical = 11, 2 and 4 about half as long as 1, 3 = 5, whence the joints lengthen slightly to apex.

Prothorax (2·5 mm. wide) slightly convex, half as wide again as long, widest at a third from apex, front angles rounded and fringed with long hairs, sides rounded in front, sinuate behind and falling on base at nearly a right angle, median part of base widely though slightly produced backwards, sides of base oblique and emarginate, median line very fine, surrounded by a depressed area, transverse impressions, and especially basal foveæ, well marked; surface coarsely punctate.

Elytra rather flat, parallel, not quite twice as long as wide, truncate, and with a fine membranous border at apex, punctate-striate, intervals slightly convex, with two rather irregular rows of punctures, interval 8 rather wider than the others, more closely and quite irregularly punctate; front spot rounded, placed just before middle, and covering intervals 3–7, hind spot close to apex, covering intervals 1–6 (though leaving a thin dark line at suture), tapering outwards. Underside rather shiny, middle of head and of sterna with only a few scattered punctures.

In appearance strikingly like *Macrochilus trimaculatus*, Oliv., the general form and the elytral spots being almost exactly similar; the size, however, is uniformly smaller, while the form of the labrum and maxillæ and the totally different shape of the last joint of the maxillary palpi give an easy means of discrimination.

British Sikkim: Gopaldhara (*H. Stevens*), 1 ex., type. Mr. Stevens has kindly allowed me to retain this in my collection.

Burma: Tenasserim, Mergui (*Doherty*). Assam: Sadiya (*Doherty*).—British Museum.

British Sikkim: Pashok, 2500′ (*L. C. Hartless*).—Indian Museum.

Bombay: Bassein Fort. Bengal: Chapra (*Mackenzie*).—Pusa Agric. Res. Inst.

Indo-China: Yen Bay (*Dr. Deyrolle*).—Coll. E. Fleutiaux.

Indo-China: Tonkin, Hoabinh; Annam, Cuarao; Laos, Vientiane, Muong Sai, Sop Choun, Natung, Houei Ko (*R. Vitalis de Salvaza*).

Indo-China: Annam, Vinh.—Brussels Museum.

LIX.—*On the Cynodontia.* By D. M. S. Watson.

In various recent papers I have divided the advanced Theriodont reptiles which possess a secondary palate of mammalian type into two groups:—

The Cynodontia, which have no suborbital vacuities.

The Bauriamorpha, which have large suborbital vacuities.

The former group has descended from the Gorgonopsians, a conclusion placed, I hope, almost beyond doubt by the description by myself (not yet published) of a series of forms leading up to their structure. The other group appears to have arisen independently from the Therocephalia.

All the recent discussions of Cynodont affinities have been founded on *Gomphognathus* (*Diademodon*), the structure of whose skull is known in very great detail (Broom, 1912; Watson, 1912 and 1913). *Gomphognathus* is, however, one of the most advanced Cynodonts, and hence less useful for comparison with more primitive reptiles than an earlier form would be.

I therefore purpose to describe as fully as the material allows other Cynodont forms in the ensuing paper.

Galesaurus planiceps, Owen, 1859.

Type and only known material, a slightly crushed and damaged skull from the "Rhenosterberg," Cape Province.

The Rhenosterberg referred to forms part of the Sneewberg Range, about 20 miles to the N.E. of Graaf Reinet. Other fossils from the same locality include *Lystrosaurus* and an advanced *Cynognathus*-zone Cynodont, *Cynochampsa laniaria*.

The matrix of the *Galesaurus* skull is that of the *Lystrosaurus* skulls from the same locality, and it is hence not improbably of *Lystrosaurus*-zone age—*i. e.*, the base of the Trias.

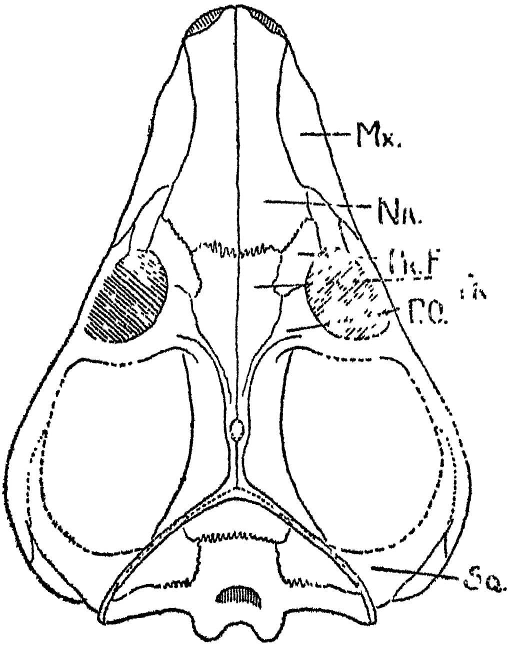
The skull was well described by Owen (Q. J. G. S. vol. xvi. p. 58, and 'Catalogue of Fossil Reptiles of S. Africa,' p. 23, pl. xviii.).

The occipital condyle is double, the two presumably exoccipital condyles being separated by a distinct wide gap. The occiput is remarkably wide and low, very square cut. It has the usual Theriodont structure of an occipital plate overlapped by a median interparietal and a pair of tabulars which form the upper borders of the small post-temporal fossæ, which lie high up. The tabular does not extend down to the paroccipital outside the fossa. The paroccipital process, correctly determined by Owen, is very massive and distally supports the squamosal.

The parietals together roof the brain-case, forming an unexpectedly wide intertemporal bar, and surrounding the medium-sized pineal foramen. The posterior end of the parietal unites with the interparietal and the tabular, and the front face of its posterior wing is overlapped by the squamosal. The anterior end of the parietal is not terminated by a recognizable suture, but it is obvious that it forms a short pointed area on the top of the skull separated from its fellow nearly back to the pineal foramen by the wedge-shaped posterior ends of the frontals and overlapped externally by the postorbital.

The frontals are unusually large, but are completely excluded from the orbital margin. The postorbital, prefrontal, lachrimal, and the orbital end of the jugal agree exactly with those of *Gomphognathus.* The nasals are large bones, only very slightly expanded caudally; in correlation with the

Fig. 1.

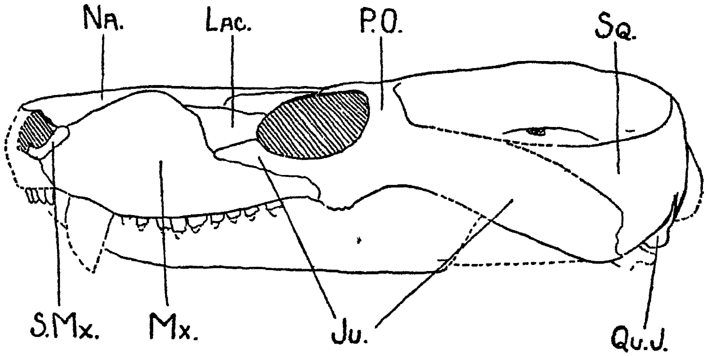


Galesaurus planiceps, Ow. The type-skull viewed from above, × 1.
Fr., frontal; Mx., maxilla; Na., nasal; P.O., postorbital; Pr.F., prefrontal; Sq., squamosal.

great width of the snout they are wide throughout their length. The anterior margins of the nasals are nearly straight lines placed at an angle of about 45° with the mid-line of the skull. The nostrils in consequence look forward and outward and not at all upward.

The squamosal is a large very massive bone which articulates powerfully with the end of the paroccipital process, and is further supported by the tabular covering its hinder surface and by an extension of its inner and upper corner on to the outer surface of the parietal.

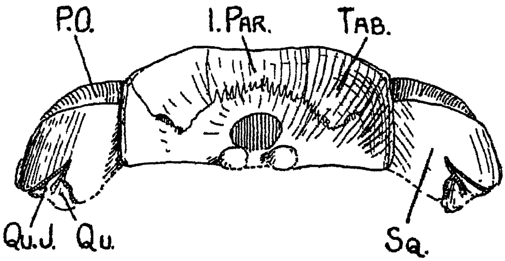
Fig. 2.



Galesaurus planiceps, Ow. The type-skull viewed from the side, × 1. Reference-letters as before, with:—Ju., jugal; Lac., lachrimal; Qu.J., quadrato-jugal; S.Mx., septomaxilla.

The upper surface of this massive root of the squamosal is flattened and plunges down into the temporal fossa. Laterally to its root the squamosal projects outward and

Fig. 3.



Galesaurus planiceps, Ow. Type-skull from behind, × 1. I.Par., interparietal; Qu., quadrate; Tab., tabular.

downwards, the thin lower margin being incised by a triangular notch associated with the insertion of the quadrate complex.

Finally, the squamosal runs forward along the upper edge of the zygoma for some distance. The whole squamosal region is rounded, differing markedly from its contour in *Gomphognathus*.

The jugal is a large bone, forming the whole of the lower margin of the orbit, and sending a long, very strong, process back below the postorbital and squamosal to form the major part of the zygoma. Below the orbit the lower border of the jugal is carried down to form a low process much roughened by muscle-insertions, which is homologous with a much larger process in *Cynognathus* and *Gomphognathus*. This process is presumably associated with the musculature of the lips.

The maxilla is, as always in Cynodonts, a large deep bone extending forward with its upper edge in contact with the jugal, lachrimal, nasal and septomaxilla to a sutural overlap on to the premaxilla.

The premaxilla is only incompletely preserved, the outer wall of the alveoli and the internarial process being broken away.

The septomaxilla is a relatively large bone lying on the anterior border of the maxilla and excluding that bone from any participation in the nostril. It forms a small exposed area on the face, extending inwards as a vertical plate of bone for some distance; the anterior surface is depressed into a conical pit, bounded externally by the maxilla; between the two bones is a small foramen, not visible from the side, which is the last remnant of the septomaxillary foramen, which is shown by comparison with Fawcett's figures of *Tatusia* to be probably for the passage of the ductus naso-lachrimalis.

The septomaxilla has a small upstanding process at its lower end, but appears to lack the customary process at the middle of its height.

Quadrate.—The quadrate complex is a small bone visible only from behind through the notch in the lower part of the squamosal. It is clearly divided into two parts—an inner (the quadrate) and an outer attached only to the lower edge of the quadrate and separated from it above by a groove ending in an enlarged foramen; this element is the quadrato-jugal, here recognized for the first time in a Cynodont.

It is clearly shown by the specimen that the outer edge and upper end of the notch in the squamosal are moulded on the quadrato-jugal, the lower part of the inner border of the notch, which is so cut out as to produce an incipient division into two, bearing a similar relation to the quadrate.

Brain-case.—The brain-case is still incompletely exposed, but it is obvious that the structure is very much as in *Gomphognathus*, there being a much expanded epipterygoid with a venous groove along the suture between that bone and the parietal and a foramen opening into it.

The stapes is a short bone, very nearly as wide as long. It is perforated dorso-ventrally by a large foramen.

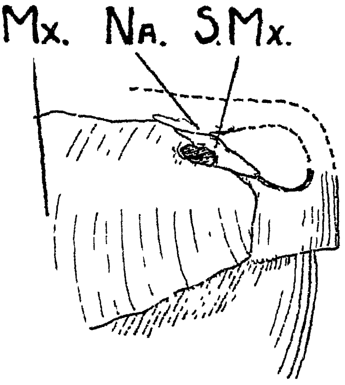
Except for one detail, the dentition was correctly described by Owen, the dental formula is $i.\ \frac{4}{3},\ c.\ \frac{1}{1},\ m.\ \frac{9}{12}$. There is no visible distinction of premolars and molars and no evidence of any kind of tooth-succession. Although Owen states that the molars are "simple crowned" and conical, there is clear evidence, chiefly from the impression on the matrix, that they are flattened, being oval in cross-section, with the long axis antero-posterior; and cusped, the anterior cusp being the main cone, and being followed by one or two smaller subsidiary cusps.

The upper canine is a tooth of extraordinary antero-posterior width.

Cynosuchus supportus, Owen, Cat. Foss. Rept. S. Afr. pl. xvii.

Type, Brit. Mus. Nat. Hist. *Cisticephalus*-zone, Stylkrantz, Sneewberg. The snout slightly dorso-ventrally crushed and broken, but well preserved.

Fig. 4.



Cynosuchus supportus, Ow. The left side of the snout of the type, × 1.

A complete skull in the South-African Museum has been partly described by Haughton. As I hope Mr. Haughton will shortly publish a full account of his most important specimen, I here give only notes of some morphologically important features shown on the type.

It is obvious that the snout was very low and broad, the width at the canine being of the order of one and a half times the height. The snout is very short, the whole descending flange of the pterygoid being preserved on the right side. Although no part of the orbital margin is preserved, there is no doubt that the orbit lies immediately behind the broken posterior edge of the specimen, that part of the jugal which forms its lower border being preserved on the right side. The upper dental formula is correctly given by Owen.

There is a large septomaxilla shown on both sides, which articulates with the maxilla and premaxilla, and is wedged in between the maxilla and nasal above in a typically Gorgonopsid fashion. There is a septomaxillary foramen of fair size lying between the maxilla and septomaxilla, and opening out on the side of the face.

The anterior border of the nasals seems to have projected over the nostril as in Gorgonopsids.

Nythosaurus larvatus, Owen, Cat. Foss. Rept. S. Afr. pls. xx. and xxxiv. p. 24.

Type-specimen, Brit. Mus. Nat. Hist. R. 1713, the ironstone cast of the inside of the skull and lower jaw. Said by Owen to be from "Tafelberg," Sneewberg; by Broom from the Caledon Road, O.F.S.; collected by W. G. Atherstone. Horizon unknown, probably *Lystrosaurus*- or *Procolophon*-zone.

Type further described by Seeley (Phil. Trans. B, vol. 180, p. 278) and by Watson (Ann. & Mag. Nat. Hist. ser. 8, vol. xii.).

Brit. Mus. Nat. Hist. R. 847. Cast of the nasal cavity, with the maxillary and some mandibular teeth well preserved.

The dentition shown on the type-skull is $i.\ \frac{?}{?},\ c.\ \frac{1}{1},\ m.\ \frac{8}{.}$

R. 847 has eight upper molars and suggests six or seven lower molars.

The only additional point of interest to be extracted from the specimen is that there is a relatively large reflected lamina of the angular originating just behind the dentary and extending downwards and backwards as a fan-shaped bone.

Thrinaxodon liorhinus, Seeley, Phil. Trans. B, vol. 185, p. 990.
("*Galesaurus planiceps*" in errore); Owen, Q. J. G. S. vol. xliii. pl.
("*Nythosaurus larvatus*" in errore); Broom, Proc. Zool. Soc. 1911, p. 900.

Type-specimen, Brit. Mus. Nat. Hist. R. 511, a remarkably complete skull and lower jaw with fragmentary axis and atlas very well preserved and prepared. Locality "Orange Free State," horizon unknown.

R. 511*a*, an incomplete, well-preserved, adult skull, obviously from the same locality as the type.

R. 3731, perfect skull and lower jaw, with fragments of atlas, axis, and manus. Juvenile specimen, showing tooth-change. "Griqualand."

Broom's *Ictidopsis*, from the *Lystrosaurus*-zone of Harrismith, where it is associated with *Lydekkerina*, may be co-generic. It is not improbable that the type-skull may have been found with the types of *Lydekkerina*.

The skull and lower jaw of this species have been described by Owen, Seeley, and Broom, and Woodward (under the name *Galesaurus*) has given an interpretation of the palate. The general structure in this family is well known.

The more interesting new details are:—

The occiput is triangular, the squamosal articulating with the occiput low down, as in *Cynognathus* and *Gomphognathus*.

The auditory groove is bounded internally by a shallow long recurved process from the squamosal, very much in the Gorgonopsid fashion, the groove not being carried out on to the side of the head as in later Cynognathids.

The quadrate complex is fixed into two notches in the lower border of the squamosal.

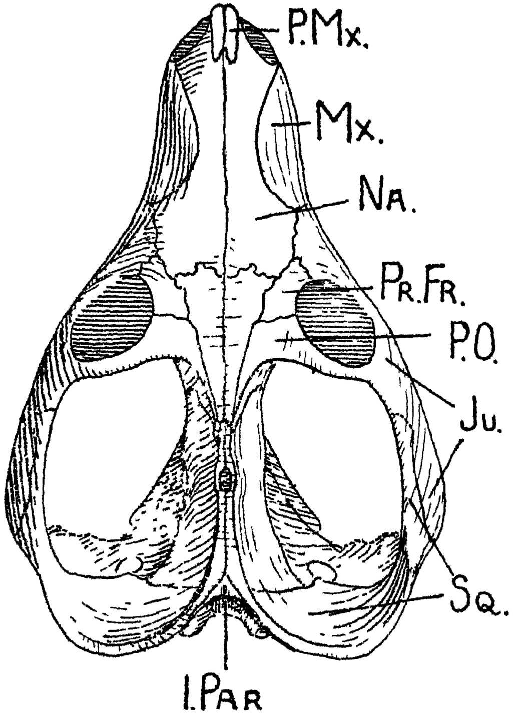
On the upper surface the relatively large size of the frontal and lachrimal is noticeable.

The nostril faces largely forward, and is not in any way overhung by the anterior border of the nasal. The septomaxilla is small, has a small facial exposure, and is entirely separated from the maxilla by the premaxilla below and the nasal above. Between the septomaxilla and maxilla is a small septomaxillary foramen opening on the side of the face.

The brain-case is quite similar to that of *Gomphognathus*. The foramen for the tenth nerve opens on the lower surface of the triangular basicranial mass. The fenestra ovalis is a small opening on the side of this mass.

The epipterygoid is widened so as to form a long lateral wall to the anterior part of the brain-case. It is produced backward to articulate with the quadrate, and is supported by a massive process arising from the anterior face of the par-occipital process. The second and third divisions of the fifth nerve leave the brain-cavity, which is here not homologous

Fig. 5.

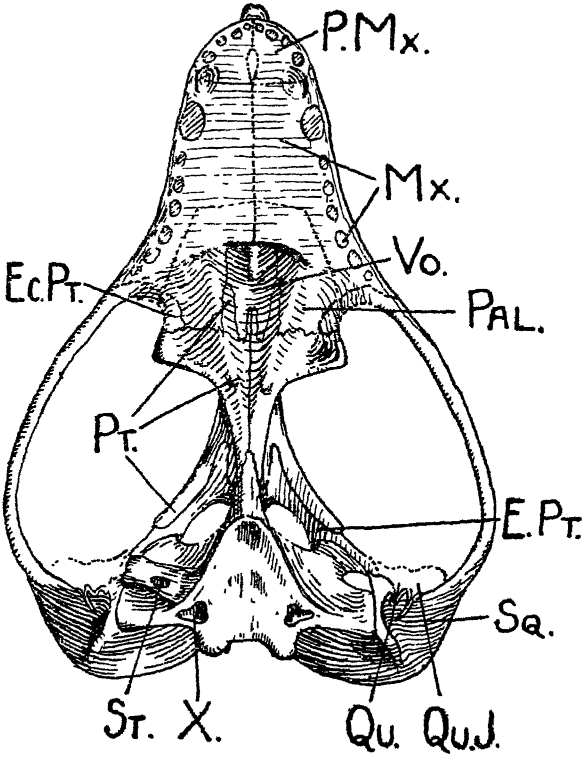


Thrinaxodon liorhinus, Seeley. Dorsal surface of the skull, chiefly from the type-specimen, × 1.

with that of a reptile but agrees with that of a mammal in including the cavum epipterycum, through a single foramen lying above the quadrate ramus of the epipterygoid.

The pterygoid is a remarkable bone; it is articulated with the lower surface of the basipterygoid processes, and has a long, slender, quadrate ramus running backward in contact with the lower edge of the quadrate ramus of the epipterygoid to the region of the anterior end of the process from the front face of the pro-otic. This structure is shown clearly in

Fig. 6.



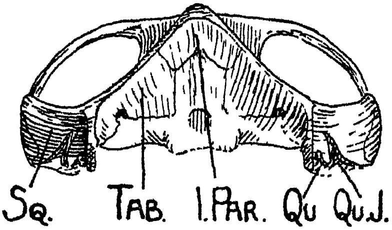
Thrinaxodon liorhinus, Seeley. Palate from the type-specimen, the secondary palate in advance of the hinder margin being concealed in the known specimens. × 1.

Reference-letters as before, with :—E.Pt., epipterygoid; Ec.Pt., ectopterygoid; Pal., palatine; Pt., pterygoid; St., stapes; Vo., vomer; X., foramen for vagus.

R. 511 and R. 3731. Anteriorly the pterygoid extends far forward on the palate, forming the side-walls of the great median groove which forms the roof of the naso-pharyngeal passage. With its fellow it forms a process which splits the hinder end of the vomer into two, whilst more laterally it separates the palatine and vomer.

The ectopterygoid is a bone of medium size lying on the front of the root of the pterygoidal flange.

Fig. 7.



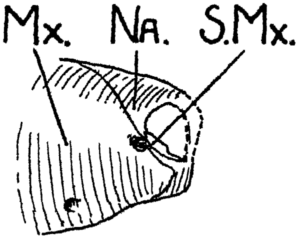
Thrinaxodon liorhinus, Seeley. Occiput of a young individual, × 1.

There is a secondary palate.

The stapes, preserved in R. 511, is a short powerful bone with a foramen passing through it.

The dentition is *i.* 4, *c.* 1, *m.* 6, the last tooth cutting late in life.

Fig. 8.



Thrinaxodon liorhinus, Seeley. Snout, to show the septo-maxillary, × 1.

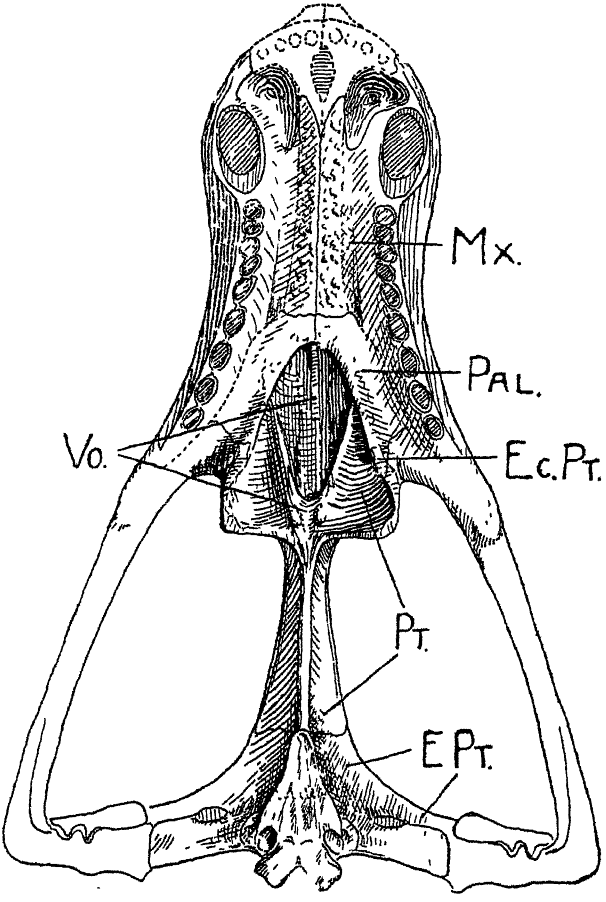
The lower jaw has been described by Broom. There is a medium-sized reflected lamina rising from the angular at its point of articulation with the dentary.

Cynognathus crateronotus, Seeley.

This species is represented in the British Museum collection by the following skull material:—

R. 2571. The skull of the type-specimen, nearly complete, but so laterally compressed as to give a very imperfect view of the palate.

Fig. 9.



Cynognathus crateronotus, Seeley. Palate, × ⅓. Reconstructed from four specimens.

R. 2572. The detached occiput figured by Seeley (Phil. Trans. B, vol. 186, p. 130). Direct comparison and measurements leave no doubt of the specific determination of this important fragment.

R. 3604. The detached and absolutely perfectly preserved maxilla figured by Seeley (Geol. Mag. 1908, p. 486).

R. 4103. A dorso-ventrally crushed skull lacking the premaxillæ and part behind the orbits, but giving a good palate.

R. 4101. An uncrushed snout, with the bone of the upper and outer surfaces weathered away, but showing the posterior part of the palate perfectly.

Measurements on the teeth leave no doubt of the specific identity of all those skulls. From them I have drawn fig. 9.

The palate of *Cynognathus*, although it is morphologically identical with that of *Gomphognathus*, Watson, 1911, presents a somewhat different appearance owing to the slenderness of the caudal part of the skull and the powerful snout. Seeley's original accurate but difficult account of the basicranial region was added to by the writer, Ann. & Mag. Nat. Hist. 1911, ser. 8, vol. viii. pp. 293–330.

The pterygoid has no quadrate ramus and is very short anteriorly, the vomer forming the whole of the roof of the groove in the palate, and separating the pterygoids to the beginning of the pterygo-parasphenoid bar.

The palatine is in contact with the vomer throughout its length. The ectopterygoid is a small bone lying at the root of the huge pterygoid flange and completely surrounded by other bones.

The isolated maxilla R. 3604 shows anteriorly the posterior part of the very deep pit for the reception of the lower canine, the whole anterior margin of its secondary plate being a sutural surface for the premaxilla. It is obvious that the structure must have been different from that of *Lycognathus* as described by Broom, Phil. Trans. B, vol. 206, p. 44. This maxilla also shows that there was a minute septomaxillary foramen opening forward at the posterior margin of the nostril.

Protacmon brachyrhinus, gen. et sp. n.

Type a beautifully preserved skull, with lower jaw in apposition, from the *Cynognathus*-zone, Essex, Dist. Albert, Cape Province, S. Africa, collected by the author.

This specimen presents an interesting accident of preservation. Although perfectly preserved and with the teeth tightly interlocked, the pre- and septomaxillaries are missing and the anterior ends of both dentaries have been broken away—removed, strangely enough, so as to leave two premolar teeth completely exposed to the base of the root, these teeth remaining in their natural position. There can be no doubt whatever that this loss is due to the bite of another animal on the fresh head with the muscles and gums intact.

In general morphology the skull is identical with that of *Gomphognathus*, differing from *G. browni* (Ann. & Mag. Nat. Hist. ser. 8, vol. viii. p. 293 &c.) in the shorter snout, longer temporal fossæ, and wider occiput. Minor differences of interest are the smaller area of the frontals and lachrimals.

The upper dental formula is *i.* ?, *c.* 1, *pm.* ? 2, *m.* 8.

The interest and generic distinction of the specimen lies in the brain-case and quadrate region.

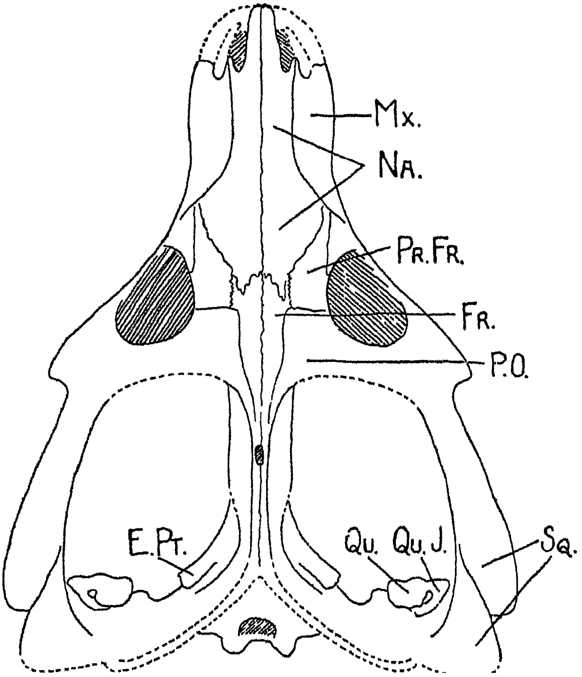
The quadrate complex consists of a small quadrate lying in a depression on the front face of the lower edge of the squamosal, and attached to that bone by the reception of its caudally produced outer edge in a slit. This quadrate is devoid of any trace of a pterygoid wing. To the outer edge of the articular margin of the quadrate is fused the quadratojugal—a very small bone whose lower edge is condylar,—the upper part of the bone running up in contact with the front face of the squamosal and being separated from the quadrate by a foramen. It expands into a narrow sheath which spreads inward between the quadrate and squamosal to be received in a slit in the latter bone. Comparison of the whole arrangement with the Gorgonopsids and Dicynodonts justifies the separation of the two elements, although no suture is visible between them.

The brain-case, as shown from behind and from the side, agrees with *Gomphognathus* in general morphology, but differs in the much greater relative size of the foramen between the prootic and the epipterygoid, which extends up to the parietal and is obscurely divided into two by a process from the front edge of the prootic. There is thus apparently a suppression of the processus prooticus superior of *Gomphognathus*.

The epipterygoid has a wide expansion on the side of the brain-case and extends back to the usual process on the front face of the prootic. It there terminates on both sides of the specimen in a slightly thickened and irregular margin, being separated from the quadrate by a gap of more than 1 cm.

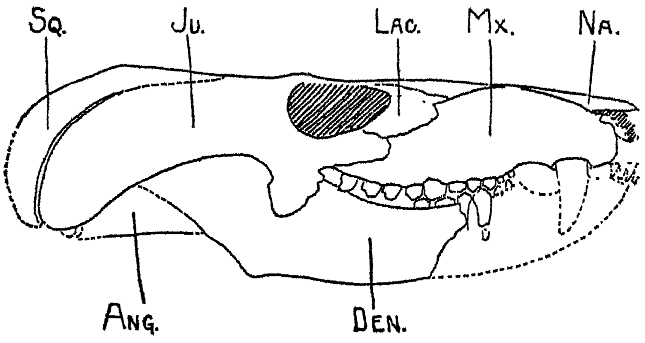
The series of venous grooves which I described on the brain-case of *Gomphognathus* appears in *Protacmon* with great

Fig. 10.



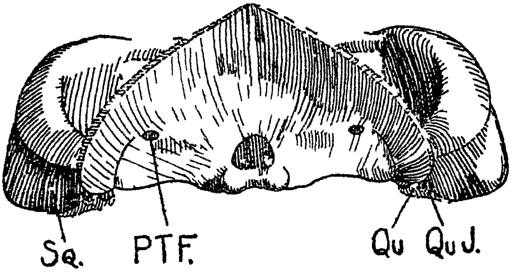
Protacmon brachyrhinus, gen. et sp. n. Type-skull, dorsal aspect, ×

Fig. 11.



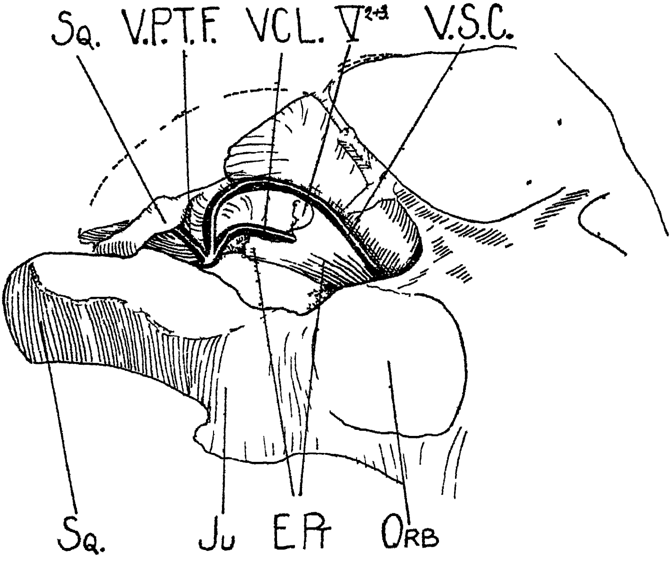
Protacmon brachyrhinus, gen. et sp. n. Type-skull, lateral aspect, × $\frac{2}{3}$.

Fig. 12.



Protacmon brachyrhinus, gen. et sp. n. Occiput of the type-skull, × ⅔.

Fig. 13.



Protacmon brachyrhinus. The type-specimen, with the block containing the upper part of the right squamosal removed, viewed obliquely from above and the right. The course of the veins in the temporal fossa, so far as it is clearly recognizable from the groove on the bones, is indicated in black.

E.Pt., epipterygoid; Ju., jugal; Orb., right orbit; Sq., squamosal; V.C.L., vena capitis lateralis; V.S.C., the vein of the 'sinus canal'; V.P.T.F., the vein which passes through the post-temporal fossa; V^{2+3}, the foramen through which the maxillary and mandibular branches of the trigeminus leave the skull.

clearness. A vein—the vena capitis lateralis—passes forward below the paroccipital process, and turns up the anterior face of that bone through the incomplete pterygo-paroccipital fossa. It then splits into three, one of which rises and passes backwards and outward through the post-temporal fossa. This fossa is overhung by a special flange of the squamosal, in order to prevent constriction of the vein by the action of the great temporal muscle.

The second vein rises up and then turns inward and forward, passing along the "sinus canal" to the orbit, but receiving a vein from the brain-case through a foramen lying between the parietal and prootic.

The third branch passes directly inward and forward along a groove on the upper surface of that process of the prootic which joins the epipterygoid quadrate wing, and finally passes into the brain-cavity through a notch on the hinder border of the epipterygoid low down in the skull. It is probable, although there is no definite evidence, that the vein receives another passing out of the brain-cavity through the upper part of the large foramen between the front of the prootic and the back of the epipterygoid.

This venous arrangement seems to occur in all Cynodonts known.

The lower jaw of *Protacmon* is perfectly preserved, although the splenial and coronoid region is not exposed. It agrees in structure with *Cynognathus* (Ann. .& Mag. Nat. Hist. ser. 8, vol. x. p. 574), but the hinder part of the jaw is still further reduced and the dentary larger.

An interesting feature is the presence on the upper surface of the surangular of a depressed roughened area adapted to the inner surface of the great groove in the dentary. This area extends back very nearly to the articular surface, but it is certain that the dentary does not in any place touch the squamosal. The extraordinarily small size of the cavity of the jaw between the surangular and prearticular is vividly shown by the specimen where the articular ends abruptly, the cavity in front of it being only 1 mm. wide and 3 high.

I have seen no trace of the reflected lamina, which, if present, must have been very small.

The series of Cynodonts described above cover the period of time extending from the upper part of the *Cisticephalus*-zone, of extreme Upper Permian age, to the *Cynognathus*-zone, which is earlier than Upper Trias, and shows that very considerable changes in the structure of members of the group took place during this period.

Galesaurus and *Cynosuchus* represent very nearly the same morphological stage, being little more advanced than the contemporary Gorgonopsid *Arctognathus*.

Primitive features are:—

1. The low wedge-shaped snout.
2. The overhang of the anterior border of the nasal.
3. The large facial exposure of the septomaxilla.
4. The only slightly complicated molar teeth.
5. The broad low occiput and the depth of the squamosal at its attachment to the brain-case in *Galesaurus*.
6. The mode of articulation of the quadrate complex in *Galesaurus* to be compared with *Asthenauchenia*.
7. The relatively large quadrate and hinder part of the jaw.

Advanced features are:—

1. The reduction of the parietal region to a sagittal crest.
2. The presence of paired occipital condyles.
3. The secondary palate.
4. The increase in the number of cheek-teeth.

Nythosaurus retains a primitive feature in its very large reflected lamina from the angular.

Thrinaxodon is in general more advanced than the preceding form, but retains as primitive features:—

1. The facial exposure of the septomaxilla.
2. The septomaxillary foramen opening outward.
3. Large frontals and lachrimals.
4. A long quadrate ramus of the pterygoid.
5. A considerable forward extension of the pterygoid on the sides of the median groove of the palate.
6. The small auditory groove.

It is advanced in:—

1. The lack of an overhanging anterior border of the nasal.
2. The powerful quadrate ramus of the epipterygoid.
3. The position of the foramen jugulare on the lower surface.
4. The insertion of the quadrate complex into two slits in the lower border of the squamosal.
5. The triangular occiput.

Cynognathus agrees very closely with *Gomphognathus* in structure.

It is advanced over *Thrinaxodon* in:—

1. Further retraction of the anterior border of the nasal.
2. Loss of the facial exposure of the septomaxilla.
3. Further specialization of the dentition.
4. Further reduction of the hinder end of the lower jaw.
5. Complete loss of the quadrate ramus of the pterygoid.
6. Regression of the anterior margin of the pterygoid and loss of the process separating the palatine and vomer.
7. Backward extension of the vomer.

Protacmon, the most advanced Cynodont known, differs from its ally *Gomphognathus* in the complete loss of the quadrate ramus of the epipterygoid, thus freeing the quadrate, and in a further reduction in size of the bones of the back of the jaw.

This loss of any connection between the epipterygoid and the quadrate is the logical completion of the whole evolution of this region in Theriodontia.

In early Gorgonopsids there is a normal quadrate ramus of the pterygoid, passing behind the pterygoid ramus of the quadrate.

In *Arctognathus* the pterygoid fails to reach the quadrate by a few millimetres.

In *Thrinaxodon* the pterygoid has a considerable quadrate ramus lying below that of the epipterygoid, which itself passes back to the quadrate.

In *Gomphognathus polyphagus* there is no quadrate ramus of the pterygoid, but the hinder surface of the quadrate ramus of the epipterygoid is supported by a long splint from the quadrate. In *G. browni* this quadrate splint is lost and the epipterygoid and quadrate only just meet. In *Protacmon* they are widely separated and the quadrate is supported solely by the squamosal.

Thus, known Cynodonts give us a series of morphological stages, which bridge over the gap between the advanced Gorgonopsids like *Arctognathus* and so remarkably mammal-like an animal as *Protacmon.*

I am indebted to the Percy Sladen Fund for assistance in visiting South Africa and there collecting the type-skull of *Protacmon.*

LX.—*Observations on the Succession of the Gastropods* Paludestrina ulvæ *and* ventrosa *in Brackish Water.* By G. C. Robson, B.A.

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In the marshes immediately west of Leigh-on-Sea, in Essex, there is a system of tidal ditches in which can be seen a gradual transition from an estuarine to a brackish fauna and flora. Two of the most prolific members of this fauna—the Gastropods *Paludestrina ulvæ* and *ventrosa*—were selected for ecological study in May of the present year, and observations were made upon them periodically until September. In the latter month some of the ditches were cleared out for agricultural or sanitary purposes, and, as a consequence, the observations were discontinued. Although a year's observations are desirable in such cases, certain of the distributional phenomena recorded were so constant and well marked as to justify publication.

Due west of Leigh the first marsh forms a narrow plain between low cliffs and a lateral channel of the Thames known as "Leigh Ray." The marsh appears to be rather lower than the high-tide mark of the river, and is protected from the latter by a high sea-wall.

Inside and parallel to the latter is a ditch about 8–9 feet wide which receives supplies of sea-water at intervals (*v. infra*) through a drain piercing the wall. From this main ditch are given off at right angles a number of secondary ditches, which traverse the marsh and receive a certain amount of surface-drainage. These ditches are obviously artificial, and give the impression that the marsh was at one time either cultivated or used for sewage-disposal. At either end the main ditch bends at right angles and forms two secondary ditches, of which there are six in all. Four of these are in open communication with the main ditch, though they appear to be drying up. The two others were cut off from the main ditch during the period of observation. It is the relation of their fauna and flora to those of the main ditch that is the matter of special interest.

Of the two closed ditches, one—the westernmost of all—was separated by a considerable patch of dry land developing (probably through local elevation) in what was once obviously a continuous channel. The other closed ditch—the fourth from the west—was separated only by a few feet of dry land rising an inch or so above the water-level at the point of junction.

There can be very little doubt that both these ditches receive water from the main ditch, but only at intervals when the latter has received an exceptionally large supply from the river. It is impossible to be certain whether the main ditch gets filled at *every* high tide and the secondary ditches only at every spring tide, or whether the main ditch is untouched by the neaps and filled by the springs, and the secondary ditches only added to by exceptionally high springs. It is certain, however, that the closed secondary ditches do not receive as much sea-water as the main ditch. Variation in the amount of water in the former, and, as a consequence, in its temperature and salinity, must therefore be more marked in the closed than in the main ditches, at least in the summer and early autumn months.

The fauna and flora of the three ditches is indicated in the following lists. They are by no means exhaustive, but indicate the chief forms or associations observed:—

A. Main ditch (eight stations: May–September):

Nereis diversicolor.
Paludestrina ulvæ (swarming).
—— *ventrosa* (rare).
Alderia modesta.
Limapontia (sc.) *nigra.*
Cardium edule.
Carcinus mænas.
Gobius sp.
Ulva lactuca.
Vaucheria sp.
Salinity: 2·76 °/ₒ–2·95 °/ₒ NaCl.

B. Westernmost secondary ditch (closed) (four stations: May–September):

Paludestrina ulvæ (very rare indeed, only in August).
—— *ventrosa* (swarming).
Palæmonetes varians.
Carcinus mænas.
Ruppia maritima (May–July).
Enteromorpha intestinalis (August).
Vaucheria sp. (August).
Salinity: 2·47 °/ₒ–2·75 °/ₒ NaCl.

C. Fourth secondary ditch from west (closed) (four stations: May–September):

Upper end—

Paludestrina ventrosa (swarming).
Ruppia maritima (May–July).
Enteromorpha intestinalis } (August).
Vaucheria sp. }
Salinity: 2·78 °/₀–2·9 °/₀ NaCl.

Lower end—

Paludestrina ulvæ (swarming).
—— *ventrosa* (moderately numerous).
Ulva lactuca.
Salinity: 2·78 °/₀–2·95 °/₀ NaCl.

From the above lists it will be seen that *Paludestrina ulvæ* appears to be limited to water in which *Ulva* occurs. Stragglers may be found upon other plants (*Enteromorpha intestinalis* and *Schlerochroa maritima*) in this area, but it attains its maximum upon *Ulva*. *P. ventrosa*, on the other hand, appears to be less restricted in its distribution, as it occurs in quite appreciable numbers in all three ditches and upon a variety of plants. It therefore may be reckoned as more plastic and adaptable than *P. ulvæ*, though it undoubtedly thrives in permanently brackish water—an assumption borne out by its absence from typically estuarine faunas.

Attempts were made with artificial sea-water to discover the lowest degree of salinity that *P. ulvæ* would tolerate. For reasons given below it was impossible to arrive at any precise figures, but this much was satisfactorily ascertained—that in water under ·5 °/₀ NaCl the animal contracted immediately upon immersion and never emerged from its shell as long as it remained in that water, while in water of 1·0 °/₀ NaCl it showed no obvious discomfort upon immersion and, on the whole, behaved very much as it did in higher salinities. Placed in water from C (upper end), from which it is normally absent, it behaved in its ordinary fashion.

In the course of these attempts a curious confirmation was obtained of the view that *P. ventrosa* is more adaptable than *P. ulvæ*. The behaviour of the two animals in captivity is very different. *P. ventrosa* proved itself a very satisfactory subject, as it always remained in the water in which it was placed. *P. ulvæ*, on the other hand, was invariably intractible. It usually crawled out of the water, and, if possible, out of the vessel containing it, even if the salinity of the water was normal.

It is clear from this account that there must be some factor limiting the distribution of *P. ulvæ* as compared to that of *P. ventrosa.* It is plain that it has the opportunity of getting into the last closed ditch and the upper waters of the fourth ditch, but is never found in the latter and only very rarely in the former. Salinity cannot be the limiting factor, as we have seen that it tolerates low salinities and it also occurs in other places—*e.g.*, the Exe estuary (1)—where it must experience considerable daily alteration in salinity. Temperature need scarcely be considered, as all the ditches are adjacent and very shallow. The main ditch is usually rather deeper than the others; but *P. ulvæ* has been found elsewhere swarming in water as shallow as that of the closed ditches.

On the whole, it seems more likely that the presence or absence of a food-plant is the limiting factor. *P. ulvæ* is not limited to *Ulva lactuca*, as it occurs at Leigh on *Schlerochroa maritima*, on *Ulva*, *Enteromorpha*, and *Zostera* plentifully in the Exe estuary (1), and on *Ulva* and *Zostera* in the Pagham lagoon (Robson MS.). But it is plain that in this area nothing had tempted it out of the *Ulva*-water to colonize in water from which *Ulva* was absent even in August when *Enteromorpha* had replaced *Ruppia.*

One must therefore conclude that *Ulva* is the limiting factor in the present area and that the mollusc has not yet adapted itself to the other available plants, though elsewhere it is not limited to *Ulva lactuca.*

It would be interesting to know if the chief plants of this area show the succession usually found, and so to show that the succession of the two molluscs depended ultimately upon the physical factors determining the distribution of the plants. Unfortunately the minimum salinity which *Ulva lactuca* tolerates is apparently unknown, nor are there apparently any British records for the exact distribution of *Ruppia maritima.* It has been shown that the latter occurs with *Zostera* and apparently *Ulva lactuca* in tidal waters in America (3).

It should also be pointed out that in the main ditch there were signs of pollution (either natural or from sewage), which might easily disturb the ordinary plant succession and account for the fact that in two ditches only differing in a slight degree of salinity there is such a marked difference in the flora. It is well known that *Ulva lactuca* tends to thrive in polluted water (2).

The author is indebted to Mr. F. J. Lambert of Leigh for assistance and information as to local conditions, to Dr. G. F. Prior, F.R.S., for assistance in determining salinity, and to other colleagues for identifying sundry forms enumerated above.

CONCLUSIONS.

(1) Ecologically considered *Paludestrina ulvæ* and *P. ventrosa* have distinct areas of distribution, but overlap each other slightly in this area.
(2) This overlapping is due to the greater adaptability of *P. ventrosa*.
(3) *P. ulvæ* appears to be delimited by the presence or absence of food-plants rather than by chemical or physical causes.

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(2) COTTON, A. D. Royal Comm. Sewage Disposal, 7th Report, App. iv. p. 22 (1911).
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LXI.—*Note on the Duikers hitherto referred to* Cephalophus maxwelli. By MARTIN A. C. HINTON.

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IN determining some duikers collected recently by Mr. Willoughby P. Lowe on two islands in the estuary of the Rokelle River, Sierra Leone, I have had occasion to examine all the material in the British Museum hitherto referred to *Cephalophus maxwelli*. As a result it would appear, firstly, that the mainland specimens in the collection belong to two distinct species, and, secondly, that the island forms are distinct from each other and from those of the mainland. The characters by which the four species recognized in this paper are distinguished may be tabulated as follows:—

A. Males with relatively large horns; females with horns well developed. Size slightly smaller.
  a. Nasals normal.
    a'. Dorsal pelage not grizzled, uniform dusky: ears without conspicuous

white fringes. [Sierra Leone to Senegal.] .... *C. maxwelli.*

b'. Dorsal pelage grizzled, brighter; ears with conspicuous white fringes. [Tasso Island.] .... *C. lowei*, sp. n.

b. Nasals reduced; external characters as in *C. lowei*; smallest of group. [Yatward Island.] .... *C. danei*, sp. n.

B. Males with small horns, not larger than those of females of *C. maxwelli*; females hornless, or with minute vestiges of horns. Other external characters as in *C. maxwelli*. Size rather larger. [Liberia.] .... *C. liberiensis*, sp. n.

1. *Cephalophus maxwelli*, Hamilton Smith.

1826. *Antilope pygmæa*, F. Cuvier, Hist. Nat. Mamm. vol. iii. liv. lvi. pl. 379. Based on females with horns from Senegal; nec Pallas.

1827. *Antilope* (*Cephalophus*) *maxwelli*, Hamilton Smith, Griffith's Anim. Kingd. iv. p. 267. Sierra Leone.

1827. *Antilope* (*Cephalophus*) *philantomba*, Hamilton Smith, ibid. v. p. 349. Young specimen, Sierra Leone.

1841. *Antilope frederici*, Laurillard, Dict. Univ. Hist. Nat. i. p. 623. Renaming *A. pygmæa*, F. Cuv.

1846. *Cephalophus punctulatus*, Gray, Ann. & Mag. Nat. Hist. (1) xviii. p. 167. Based on young specimen from Sierra Leone.

1850. *Cephalophus whitfieldi*, Gray, Knowsley Menagerie, p. 11.

So far as one can judge from the descriptions, and from an examination of the types of *punctulatus* and *whitfieldi*, all the names included in the above synonymy refer to *C. maxwelli* as defined in this paper.

This species is characterized by its moderate size; uniform ungrizzled dorsal pelage, the colour being dusky in adults, brighter in the young; the whitish hairs lining the ears not forming a conspicuous fringe; normal nasals; and, above all, by the relatively large horns present in both sexes; in female, horns a little less developed than in male.

The type-locality is "Sierra Leone," and the range extends from Senegal and Portuguese Guinea southwards through Sierra Leone.

2. *Cephalophus liberiensis*, sp. n.

1853. ? *Cephalophus maxwelli*, Temminck, Esq. Zool. Guiné, p. 230.

1914. *Cephalophus* (*Guevei*) *maxwelli*, Lydekker & Blaine, Cat. Ung. ii. p. 93 (in part).

Type.—An adult male (B.M. 13. 11. 21. 13) from Mount Barclay, Liberia (altitude 200 feet); collected by Mr. R. H. Bunting. Other material, ♂, ♀ (adult).

Description.—Horns of male relatively small, no larger than in females of *C. maxwelli.* Females hornless, but one specimen with minute traces of horn-cores 2 or 3 mm. in height. General outward appearance and colour as in *maxwelli.* Size slightly larger, the extreme length of skull being about 150 mm., instead of about 140 mm.

For skull-measurements see table at p. 532.

Range.—Liberia. At present known from Mount Barclay and from a spot "50 miles inland from Monrovia."

Whether Pel's specimens from Dabacrom, Gold Coast, described by Temminck under the name *maxwelli*, belong to the present species or to another unnamed form cannot be decided now, owing to the lack of sufficient Gold Coast material. Temminck describes the ears as "portent de larges bordures blanches le long de leur contour interne"; he says that the female differs from the male only "par de très-petites cornes, souvent obtuses, ou commes perdues, et cachées dans les touffes, d'où elles prennent naissance."

3. *Cephalophus lowei*, sp. n.

Hab.—Tasso Island, Rokelle River, Sierra Leone.

Type.—An old male (B.M. 20. 7. 10. 17) collected and presented by Mr. Willoughby P. Lowe.

Description.—Horns of male about as in *C. maxwelli*; female unknown, but probably horned.

Size about as in *C. maxwelli*, perhaps slightly larger.

Essential external characters as in *maxwelli*, but dorsal colour brighter and not uniform as in latter species; the back clothed with a grizzle of black and tawny, lightening on the flanks to merge insensibly in the grey of the underparts. Head-tuft and outer surfaces of ears dark brown. Ears with conspicuous linings of pure white hairs. Rump scarcely or not at all darkened. Tail dark brown above, the tips of most hairs being white.

Skull generally as in *maxwelli*, a little larger and relatively narrower; maxillary tooth-row relatively shorter, the premolar series somewhat reduced.

4. *Cephalophus danei*, sp. n.

Hab.—Yatward Island, Rokelle River, Sierra Leone.

Type.—An adult male (B.M. 20. 7. 10. 18) collected and presented by Mr. Willoughby P. Lowe. An adult female (B.M. 20. 7. 10. 19) also examined.

Description.—Horns well developed in both sexes; in

Skull-measurements in Cephalophus maxwelli *Group.*

	C. maxwelli.			*C. lowei.*	*C. danei.*		*C. liberiensis.*			
	♂. 10 4 9 29	♂. 48 10 11 5	♀. 8 6 26 7	♂. 20 7 10 17	♂. 20 7 10 18	♀. 20 7 10 19	♂. 13 11 21 13	♂. 12 5 9 11	♀. 13 11 21 12	♀. 4 6 2 12
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
1. Condylo-basal length	124·5	...	130	137·5	121	125·5	144	139	141	142·5
2. Extreme length	135	135	141·5	146	128·5	132·5	153	148·5	152	151
3. Zygomatic breadth	63·5	63	64	59·5	57·5	59·5	69	66	...	...
4. Cranial width	46	48	49·5	50	45·5	45	52·5	53	51	52·5
5. Nasal length	47	47	50	50·5	39·5	41	59·5	57	50·5	55
6. Nasal width (at base)	24·5	24	28	28·5	20	20·5	29	28	24	27
7. Orbit to tip of premaxilla	67	68	67	71	64	65	77	74	75·5	76
8. Length of diastema	42	40	43	45·5	41·5	40·5	48·5	46	46·5	46·5
9. Palatal length	65	69	70·5	71·5	61·5	65·5	78·5	76·5	75	71·5
10. $pm.^2$–$m.^3$	41	41	...	39	35·5	39	42·5	42·5	44·5	41·5
11. $m.^1$–$m.^3$	17·8	18	...	22·5	21	21·5±	24	24	25·5	22·5
12. Least distance between bullæ	10	...	9	8	10·5	11	11·5	12	12·5±	12·5
13. Length of horns	59	52	39	40*	39·5	34	44	34	0	0
Reduction 1 = 100	109	109	110	106	106·5	105·5	107	107	108	106
2 =	51·2	50·7	49·2	43·3	47·5	47·5	47·8	47·5	...	...
3 =	37	38·6	38·1	36·4	37·7	35·8	36·5	38·1	36·2	36·8
4 =	37·8	37·8	38·5	36·7	32·7	32·7	41·4	41	35·9	38·6
5 =	19·7	19·3	21·5	20·7	16·5	16·3	20·2	20·2	17	18·9
6 =	54	54·8	51·5	51·7	53	52	53·6	53·3	53·6	53·4
7 =	33·8	32·2	33·1	33	34·3	32·2	33·7	33·1	33	32·6
8 =	52·4	55·5	54·2	52	53·5	52·3	54·7	55	53·3	50·2
9 =	33	33	...	28·3	29·3	31	29·5	30·6	31·6	29·1
10 =	14·3	14·5	...	16·3	17·4	17·1	16·7	17·3	18·1	15·8
11 =	8	...	6·9	5·8	8·7	8·75	8	8·6	8·9	8·8
12 =	47·5	41·8	30	29*	32·7	27·1	30·6	24·5	0	0
13 =										

* In present condition; tips of horns have been hacked off.

males a little smaller relatively than in *maxwelli*; sexual disparity less marked than in the latter.

Coloration and external characters, apart from smaller size, exactly as in *C. lowei*; size, if anything, less than in *maxwelli*.

Skull conspicuously differing from those of other members of the group in the unusually small nasals. In both sexes these bones are shorter and narrower, absolutely and relatively, than in either *maxwelli* or *lowei*. In *liberiensis* there is a sexual difference in this respect, the males having nasals as large as, or larger than, in *lowei* and *maxwelli*, while in the females these bones approach those of *danei*. Maxillary tooth-row intermediate in relative length between *lowei* and *maxwelli*, the molar series being relatively longer than in either.

Remarks.—I have much pleasure in naming this interesting duiker after Captain A. M. Dane, of H.M.S. 'Dwarf,' to whom Mr. Lowe was indebted for much hospitality and active assistance during his trip to Sierra Leone.

LXII.—*New small Mammals from New Guinea.*

By Oldfield Thomas.

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Pipistrellus papuanus collinus, subsp. n.

Like true *papuanus*, but larger.

General characters, including colour, structure of tragus, dentition, and other details, all as in *papuanus*. Size, however, markedly larger, the forearm attaining 36 mm. as compared with 25–31 mm., and the skull also decidedly larger.

Dimensions of the type:—

Forearm 36 mm.

Third finger, metacarpal 33·5, first phalanx 13; lower leg and hind foot 22·5.

Skull: greatest length 13·2; breadth of brain-case 6·9; palato-sinual length 4·8; maxillary tooth-row 5; p^1–m^2 3·2.

Hab. of type. Bihagi, head of Mambari River, British Papua. Other specimens from Dinawa, Owen Stanley Mountains, and the Upper Aroa River.

Type. Adult male. B.M. no. 13. 11. 7. 4. Collected 13th April, 1906, by A. S. Meek.

The Pipistrels of New Guinea all seem referable to *P. papuanus*. The great majority are comparatively small, with forearms only attaining about 31 mm. The present form would appear to be a highland subspecies, characterized by its markedly greater size.

Meyer's *Vesperugo papuanus orientalis* of Astrolabe Bay is apparently quite the usual New Guinea Pipistrel.

Emballonura meeki locusta, subsp. n.

External characters quite as in true *meeki*, and size similar, though the single specimen seems rather less robust than the example of *meeki*, and the limb-bones more slender. The characteristic broadly lobed lips, the shape of the tragus, and the long, slender, grasshopper-like hind limbs all as in the typical form.

Skull smaller and lighter than in *meeki*. Inflation of muzzle much less, the inflated upper portion of the maxillaries of the two sides not extending inwards towards or to the middle line, as is the case in *meeki*, but keeping widely separated throughout, so that the nasals between them are parallel-sided and not contracted anteriorly. Behind the nasals, the forehead is more deeply concave mesially, the general concavity between the inflations extending back into the interorbital space ; the rounded supraorbital edges are not specially inflated in *meeki*, but are in *locusta*. Basial fossæ as in *meeki*, not as in subsp. *clavium*.

Dimensions of the type:—

Forearm 38 mm.

Head and body 40 mm. ; tail 13 ; ear 12 ; lower leg and foot (c. u.) 20·3 ; calcar 15.

Skull: greatest length 12 ; condylo-basal length 11·1 ; nasals, breadth between inflations anteriorly 0·9 ; interorbital breadth 3 ; mastoid breadth 6·8 ; front of canine to back of m^3 4·4.

Hab. Schouten Island, N.W. New Guinea.

Type. Adult male. B.M. no. 20. 10. 23. 2. Collected by Messrs. Pratt Brothers. One specimen only.

Readily distinguishable from true *meeki* and from *meeki clavium* by the reduced maxillary inflations, which do not trespass on the nasals between them.

Pogonomys sylvestris, sp. n.

A medium-sized species with slaty bases to the belly-hairs.

Fur long, soft, and fine. General colour above dark rufescent—near "auburn" ; sides more rufous ; under surface greyish ; the hairs broadly slaty basally, with creamy whitish tips. Hands and feet pale buffy. Tail pale brown, its fine sparse hairs whitish.

Skull slenderly built, of more normal murine proportions than in many of the species, the muzzle not shortened and the zygomata not abruptly thrown outwards. Nasals long and narrow. Supraorbital edges more parallel than usual, not strongly divergent posteriorly, the edges themselves square but not ridged. Palatal foramina short, as usual.

Dimensions of the type (measured on the remade skin):—

Head and body 112 mm.; tail 160; hind foot 21.

Skull: greatest length 30·3; condylo-incisive length 28·3; zygomatic breadth 16·2; nasals 11 × 2·9; interorbital breadth 4; breadth 2; brain-case 14·6; palatilar length 13·7; palatal foramina 4·2; upper molar series 5.

Hab. Rawlinson Mts., N.E. New Guinea. Alt. 1500 m.

Type. Adult male. B.M. no. 11. 10. 13. 6. Collected June 1911 by Prof. F. Förster. Presented to the National Museum by Lord Rothschild. Two specimens.

Distinguishable from all other species of the genus by the grey-based belly-hairs, these being usually white to the base. The skull is also peculiar in the shape of the interorbital region, which is alone similar to that in *P. macrourus* of Arfak.

Pogonomys forbesi vulturnus, subsp. n.

Like true *forbesi* in essential characters, but the general colour is more greyish, and approaches "light drab" of Ridgway, as compared with the "cinnamon" of *forbesi*. Whitish patches in front of and at posterior base of ears at a maximum, contrasting with the general grey colour.

Skull apparently quite like that of *forbesi*.

Dimensions of the type (measured on a spirit-specimen):—

Head and body 136 mm.; tail 216; hind foot 30; ear 17.

Skull: greatest length 36·3; condylo-incisive length 35·8; zygomatic breadth 21·7; nasals 13·3; palatilar length 17; palatine foramina 5·1; upper molar series 5·8.

Hab. Bara-Bara, Milne Bay, extreme South-east Papua.

Type. Adult female. B.M. no. 97. 8. 7. 64. Collected February 1890 by Dr. Lamberto Loria, and presented by the Museo Civico, Genoa. Six specimens.

The difference in the general colour of the Milne-Bay *Pogonomys* was noticed on the arrival of Signor Loria's specimens, but was then supposed to be due to the original specimens of *forbesi* having been stained by rust. Now, however, the receipt of skins shows that the cinnamon colour of the Sogere specimens is quite natural.

Pogonomys forbesi mambatus, subsp. n.

Similar in the general cinnamon-colour to true *forbesi*, but the whitish patches between eye and ear are practically absent, and there is a distinctive difference in the skull.

In *forbesi* and *vulturnus* the front edge of the zygomatic plate projects slightly forwards, so that, when viewed from above, it is visible in front of the anteorbital bridge, while from below this bridge cannot be seen. But in *mambatus* the front edge runs down quite vertically, or is even slightly concave, so that it cannot be seen from above in front of the bridge, while from below the underside of the bridge is clearly visible in the cleft of the foramen. Other cranial characters apparently as usual.

Dimensions of the type (measured on skin):—

Head and body 173 mm.; tail 236; hind foot 30.

Skull: greatest length 37; condylo-incisive length 36·4; zygomatic breadth 22·2; zygomatic plate 4; upper molar series 5·7.

Hab. Mambare River, N.E. British New Guinea in the old sense; type from Kokoda, 1000′; other specimens from Tamata and Ioma on the same river.

Type. Adult male. B.M. no. 7. 2. 1. 10. Original number 16. Collected 11th July, 1906, and presented by C. A. W. Monckton, Esq. Twelve specimens.

The difference in the skull, although slight, is so constant in the good series that we owe to the work of Messrs. Monckton and Stalker that it seems proper to recognize the Mambare form as distinct from that of Mt. Owen Stanley.

Distœchurus pennatus, Pet. & Dor.

The examination of a topotype of this beautiful marsupial obtained by the Pratt Brothers shows that three forms of it may be recognized, as follows:—

D. pennatus pennatus.

General colour paler, wood-brown above and pale creamy buffy ("light buff") below throughout, the hairs pale to the roots. Black orbital lines not broadened behind and not especially sharply defined from the light area between them. Secator (p^4, the fourth tooth from the back), although small, two-rooted, oblong, and obliquely set in the tooth-row.

Hab. Arfak region, N.W. New Guinea; Andai, Weyland Mts.

D. pennatus dryas, subsp. n.

General colour slightly darker and greyer; upper surface a darker wood-brown, and the under surface a dirty greyish white, the belly greyer than the chest. Inner surface of fore limbs quite grey, not whitish as in *pennatus*. Head-lines about as in *pennatus*, though hardly so brightly contrasted. Secator smaller, oval in section, single-rooted.

Hab. of type. Mt. Gayata, Richardson Range, British New Guinea. 3000′. The specimen from the Ethel River, Hall Sound, recorded by Ramsay (who misprints the name as *pinnatus*), was probably this form.

Type. Adult male. B.M. no. 99. 4. 4. 5. Collected by A. S. Anthony.

Hind foot of type 19 mm. Skull, greatest length 30, three upper molariform teeth 4·1.

D. pennatus amœnus, subsp. n.

Size slightly larger. Colour stronger and darker, with all the contrasts at a maximum. Upper surface near "verona-brown"; under surface more or less clay-colour, the throat yellowish, the chest creamy, but the belly more brownish, not sharply defined from the hue of the sides. Dark head-markings strongly contrasted black, broadened posteriorly, so as almost to meet in the middle line, and contracting to a point the light median area between them, the edges of which are sharply and abruptly defined. Hands and feet dull yellow.

Secator very small, circular, single-rooted.

Hab. Ex-German New Guinea. Type from the Rawlinson Mountains; another specimen from Sattelburg.

Type. Adult male. B.M. no. 11. 10. 14. 1. Collected by Prof. F. Förster.

Hind foot of type 21 mm. Skull, greatest length 31·5, three molariform teeth 4·5.

LXIII.—*Supplementary Note on the Genus* Hapalochrus, *Er.* [*Coleoptera*]. By G. C. Champion, F.Z.S.

In the present volume of the 'Annals & Magazine of Natural History,' pp. 177–201, 249–266, 305–327, pl. viii., an account is given of all the African and Asiatic species of the genus *Hapalochrus* known to me. In this article no mention is made of Kraatz's papers on the same subject (Deutsche ent. Zeitschr. 1895, pp. 59–64, 271, 272), which were overlooked by me, and they appear also to have escaped the notice of

Bourgeois, Gorham, and Pic, who do not allude to them in their descriptions of *Hapalochrus*. This oversight is, of course, due to Kraatz having placed his insects under a new genus—*Hadrocnemus*,—which is based upon the extraordinary development of the anterior and intermediate tibiæ in the males, about which Erichson says nothing in his generic diagnosis, though he mentions this character in the description of *H. azureus*, and it is also to be found in his *H. festivus*, of which he only knew the female, the type being the Eastern *H.* (*Malachius*) *lætus*, F. The name *Hadrocnemus*, applicable as it is, is not really required, there being a complete transition in the development of the tibiæ of the male from the species in which they are greatly swollen and eroded (*H. sumtuosus*, Boh., &c.) to those in which they are simple, as in the female.

The synonymy of the eight African species enumerated by Kraatz will stand as follows:—

1. *Hadrocnemus conradti*, Kr. (♂ ♀) (pp. 60, 271), from Bismarckburg, Togo=*Hapalochrus malachioides*, Fairm. (1887). Quoted in my paper (sp. no. 16) as "*H. conradti*, Pic, in litt. (?)," in the synonymy of *H. malachioides*.
2. *Hadrocnemus cœruleus*, Kr. (♂ ♀) (p. 60), no locality given, but presumably from Togo, may or may not be synonymous with the common and widely-spread W.-African *Hapalochrus azureus*, Er. (=*cœruleus*, Murr., 1867) (No. 38 of my paper). The specific name, in any case, is preoccupied for an insect absolutely congeneric. Kraatz's specimens (length 4½–4¾ mm.) appear to be a little larger than any of those referred by me to *H. azureus*; he describes the ♂ as having "femoribus tibiisque anticis intermediis testaceis, dilatatis, his extus nigris," and the elytra as nude in ♂ and shortly pilose in ♀!
3. *Hadrocnemus srnkœ*, Kr. (♂ ♀) (p. 61), from Mombasa. Not recognizable in the material examined by me. The length is given as 3 lin., presumably in error for 3 mill., as the insect is said to be small and the measurements of the other species are given in millimetres.
4. *Hadrocnemus purpuripennis*, Kr. (♀) (p. 61), from Bismarckburg, belongs to *Heterolaius*, Champ. (*ante*, pp. 178, 179), as shown by the elongate subequal second and third joints of the antennæ in ♀. It is doubtless synonymous with *Hapalochrus* (*Laius*) *inflaticornis*, Fairm. (type ♂, 1894, from the Congo) and *H.* (*Laius*) *violaceicollis*, Pic (1907). This latter name was incorrectly given by me as *violaceipennis* (*ante*, p. 179).

5. *Hadrocnemus tenuicornis*, Kr. (♀) (p. 62), from Bismarckburg. Not recognizable from the ♀ only. Possibly a near ally of *Hapalochrus filicornis*, Champ., from N. Rhodesia.
6. *Hadrocnemus viridis*, Kr. (♀) (p. 62), from Bismarckburg. This may be synonymous with *Hapalochrus fissipes*, Champ., types (♂ ♀) from the Congo, but in the absence of the ♂ of *H. viridis* nothing definite can be stated.
7. *Hadrocnemus spectabilis*, Kr. (♂ ♀) (p. 271), from Niger-Benue=*Hapalochrus constrictipes*, Champ. (sp. no. 15). The name *spectabilis* was used by Ancey in 1883 for another species of the same section of the genus, and that of Kraatz must be sunk as a synonym.
8. *Hadrocnemus* 4-*pustulatus*, Kr. (♂) (p. 272), from Niger-Benue=*Hapalochrus nobilis*, Er. (1843) (sp. no. 4 of my paper), the type of which was a ♀.

BIBLIOGRAPHICAL NOTICE.

Monograph of the Lacertidæ. By G. A. BOULENGER. Vol. I. British Museum (Natural History). 1920. Pp. x+352. Price £2.

THIS Monograph differs in plan from the other Catalogues issued by the Natural History Museum in recording, on a scale not hitherto attempted, the range of variation in each of the species. This is done, not only by the definition of named varieties where these can be recognized, but also by full descriptions of the variations of coloration and markings and by tabulation of the measurements and lepidosis of all the specimens examined. The vast extent of the material dealt with is shown by the fact that of the single species *Lacerta muralis* with its thirty-one named varieties the tables give particulars of about twelve hundred specimens. The present volume deals only with the three genera *Nucras*, *Lacerta*, and *Algiroides*—the remaining genera, nineteen in number, being reserved for the second volume, which is stated to be ready for printing.

The importance of this work does not lie only in its wealth of descriptive detail. In a series of memoirs published in the 'Transactions of the Zoological Society' and elsewhere, the author has expounded his views on the evolution of the Lacertidæ, and he here presents in systematic form the final results of his researches. Starting from the principles laid down in Eimer's well-known work on the evolution of markings in the wall-lizard, and combining with these a close study of structural characters for the most part neglected by Eimer, Dr. Boulenger has been able to map out a phylogenetic scheme for the whole family, to present a rational arrangement of the bewildering variety of forms presented by some of the species, and to correlate systematic relationships with geographical distribution. He believes that this evolution has proceeded by "a combination of orthogenetic and adaptive modifications which have led to various parallel series in this family."

The publication of this volume coincides with Dr. Boulenger's retirement from the service of the Natural History Museum, and all zoologists must regret that the most distinguished of living herpetologists is no longer officially connected with the unrivalled collection which he has done so much to build up.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

May 5th, 1920.—Mr. G. W. Lamplugh, F.R.S., Vice-President, in the Chair.

The following communication was read:—

'A Natural "Eolith" Factory beneath the Thanet Sand.' By Samuel Hazzledine Warren, F.G.S.

The paper describes a section in the Bullhead Bed at Grays, where the conditions have been favourable for the chipping of the flints by subsoil pressure. There is evidence of extensive solution of the Chalk beneath the Tertiary deposits, and the differential movements thus brought about have occasioned much slickensiding, and remarkable effects in the chipping of the flints.

In the Author's opinion the section affords the most complete and conclusive evidence hitherto obtained in support of the theory of the origin of the supposed Eolithic implements by purely natural agencies. There are not only the simpler Kentish types, such as notches, bowscrapers, and the like, but also the larger and more advanced forms of rostro-carinates which are characteristic of the sub-Crag detritus-bed. Careful digging enables the pressure-points of one stone against another and the resultant chipping effects to be studied in detail; and in many instances the flakes removed can be recovered and replaced.

A few examples are more than merely Eolithic in character. If such exceptional examples were removed from their associates, and also from the evidences of the geological forces to which they have been exposed, no investigator could be blamed for accepting them without question as of Mousterian workmanship. Individual specimens may often deceive: in order to distinguish a geological deposit of chipped flints from the débris of a prehistoric chipping-floor, it is necessary to base one's judgment upon fairly representative groups, and also to take into consideration the circumstances in which they have been discovered.

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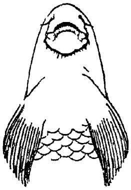

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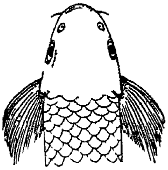

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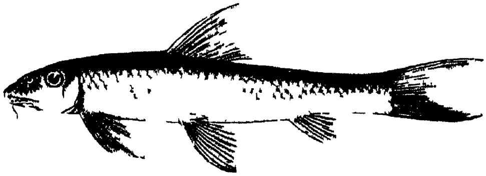

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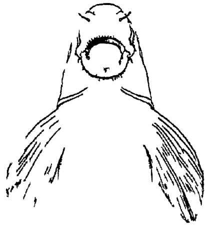

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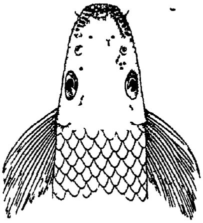

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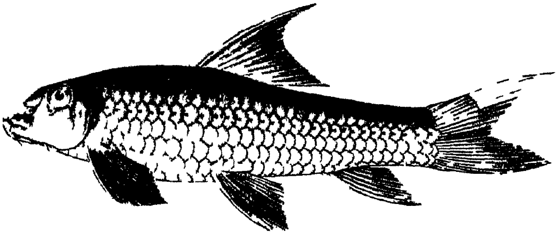

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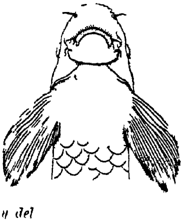

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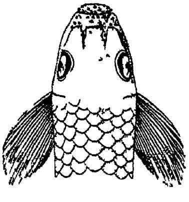

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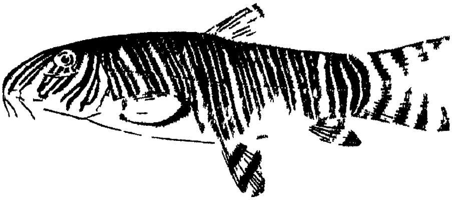

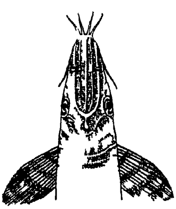

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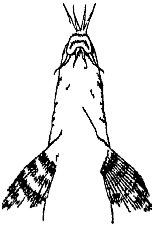

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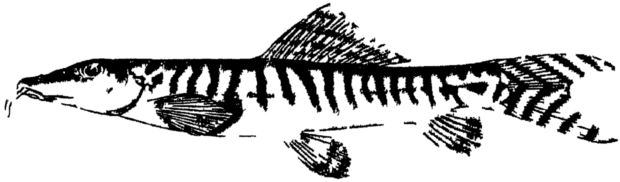

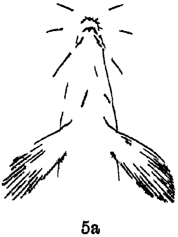

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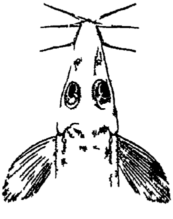

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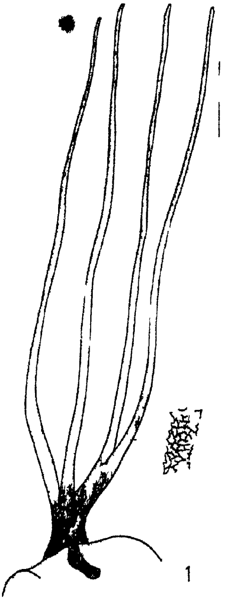

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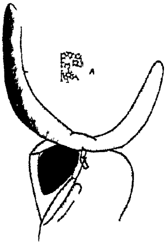

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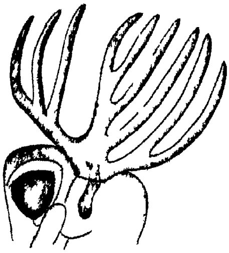

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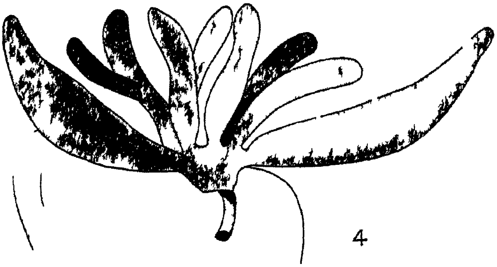

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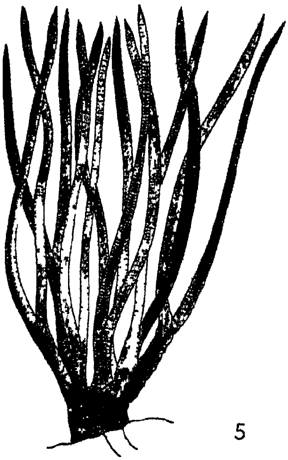

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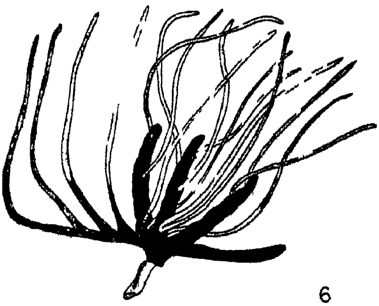

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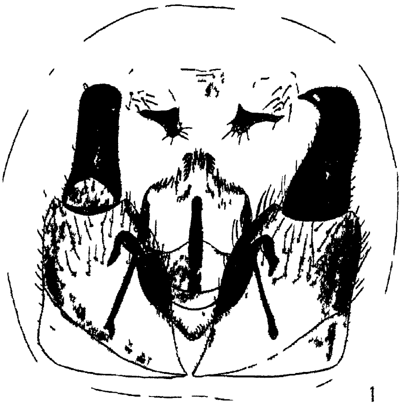

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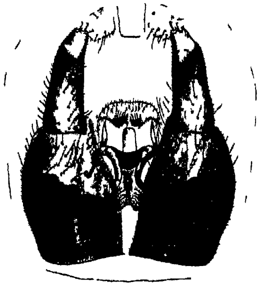

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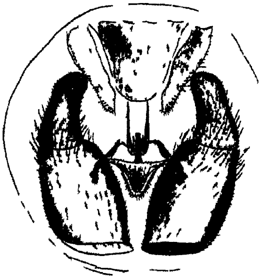

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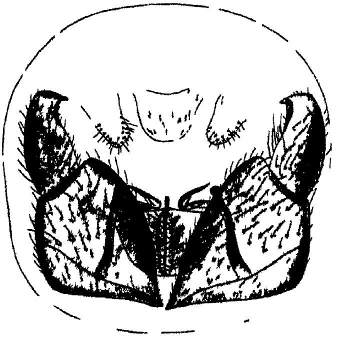

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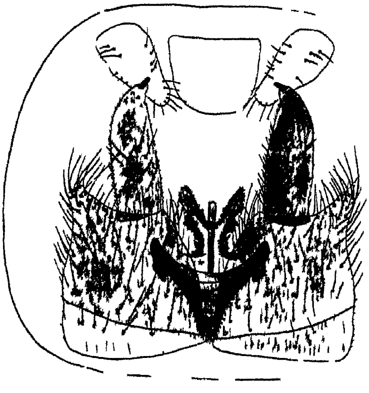

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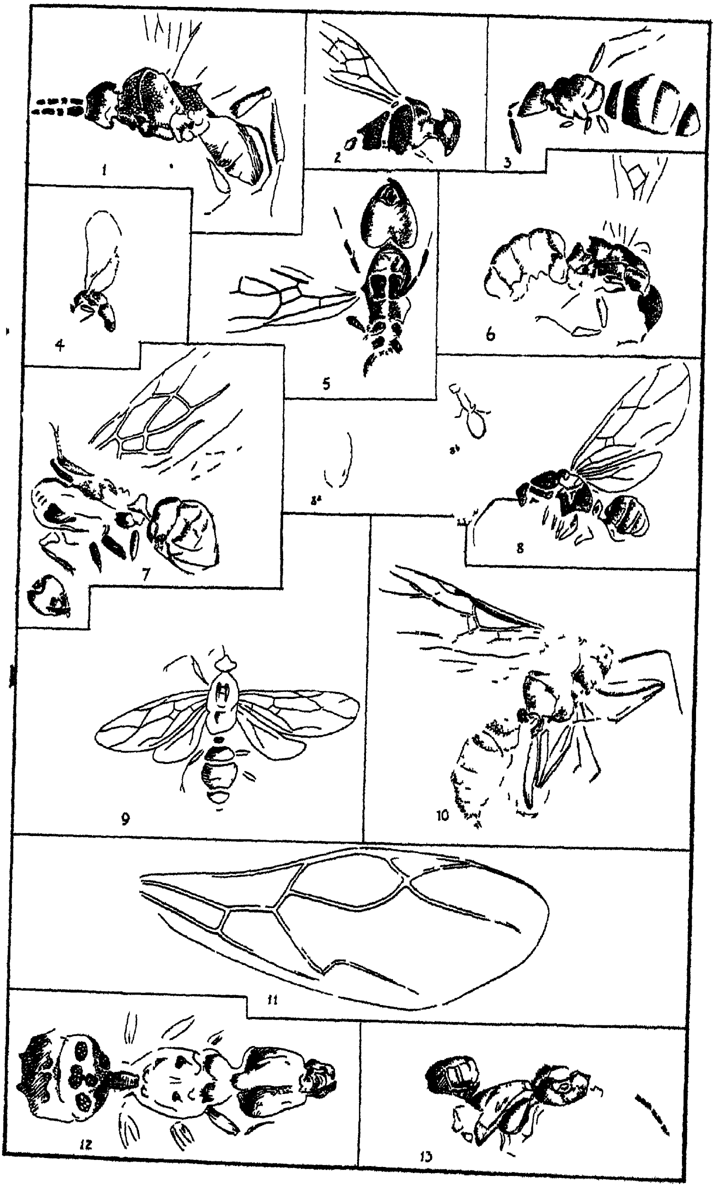
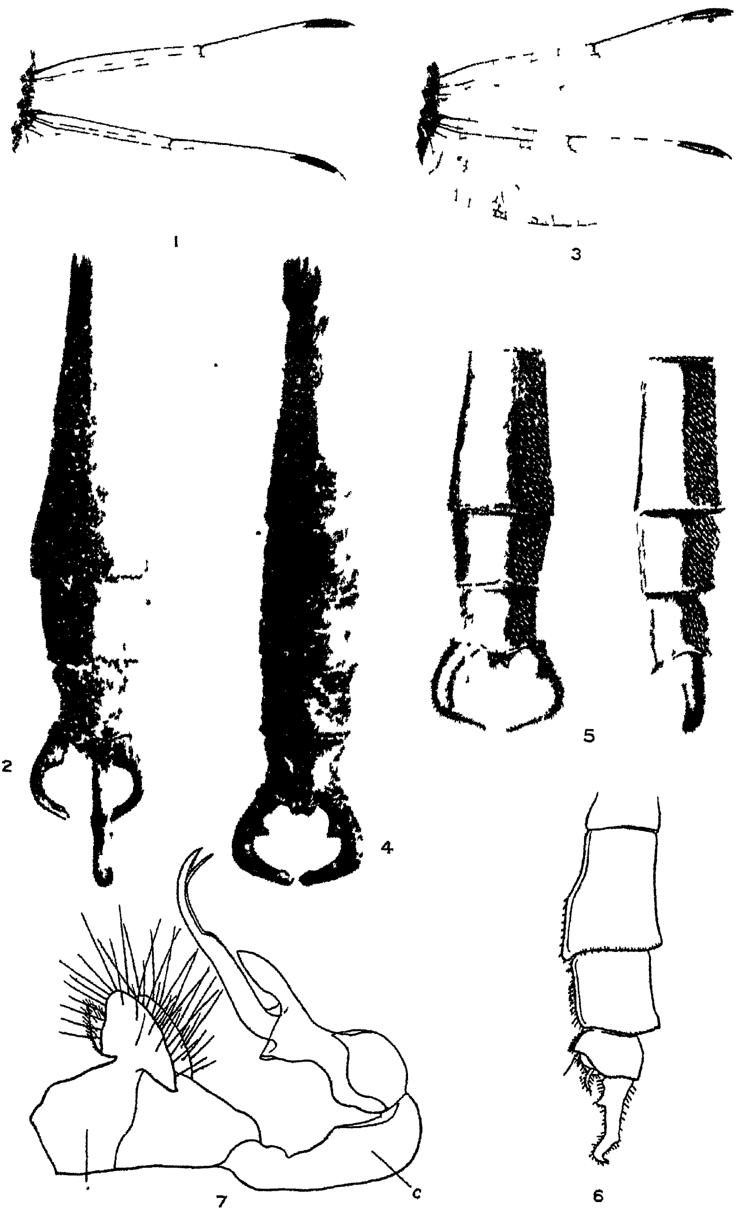
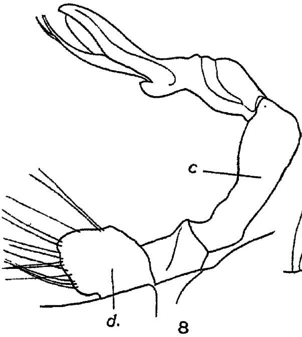


BRITISH OLIGOCENE ANTS



SOUTH AMERICAN DRAGONFLIES



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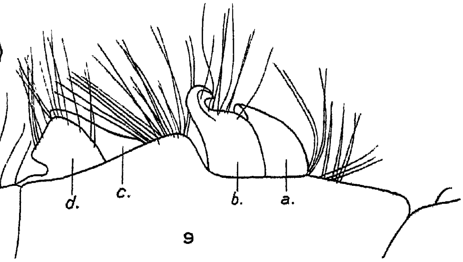

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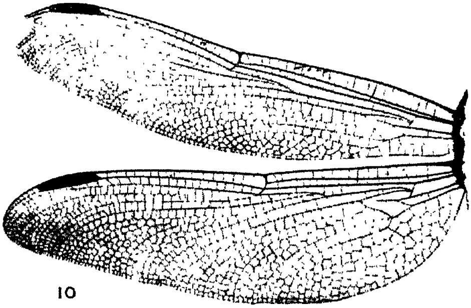

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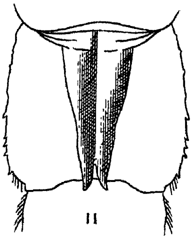

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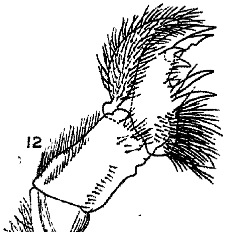

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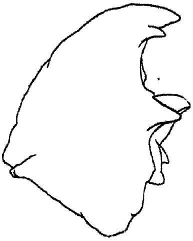

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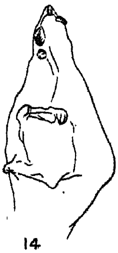

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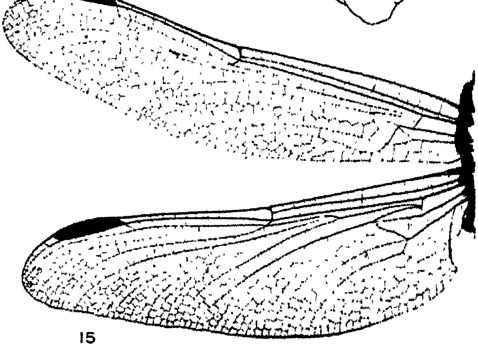

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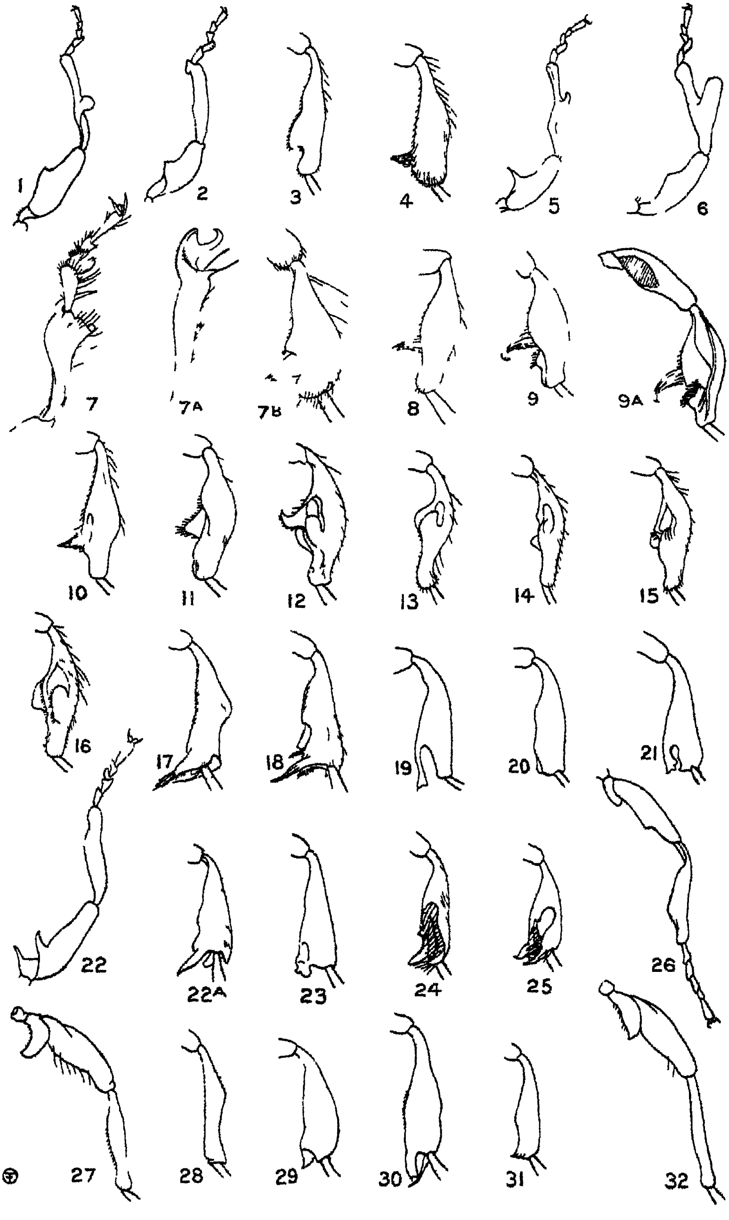
SOUTH AMERICAN DRAGONFLIES.

CHAMPION

Ann & Mag Nat Hist S 9 Vol VI Pl VIII.



AFRICAN AND ASIATIC HAPALOCHRUS

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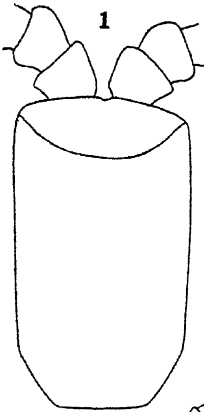

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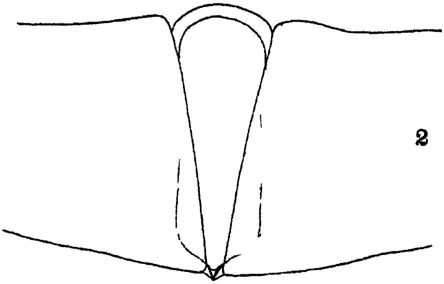

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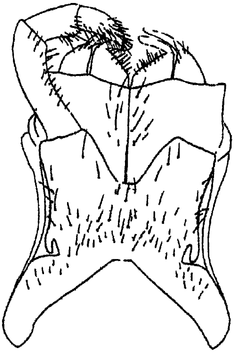

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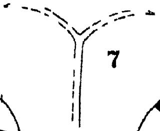

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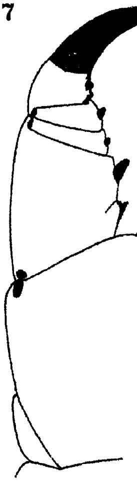

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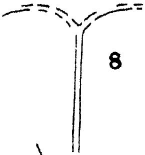

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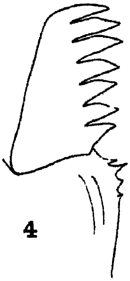

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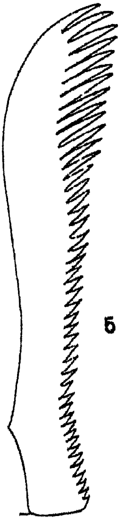

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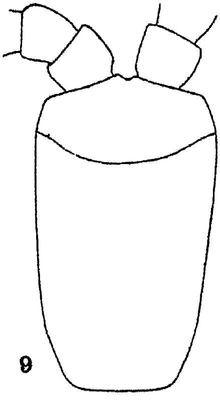

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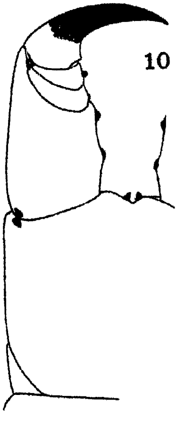

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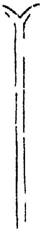

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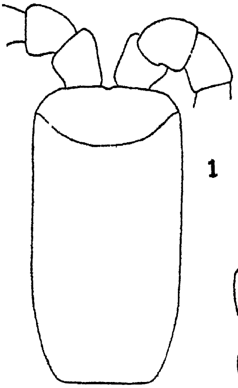

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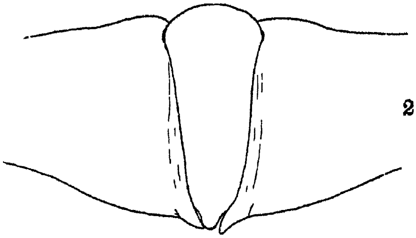

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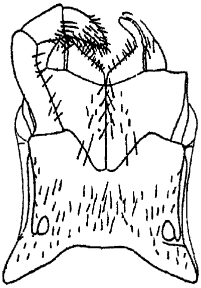

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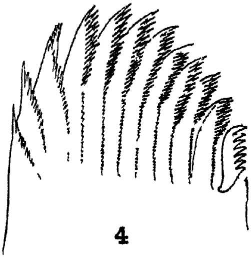

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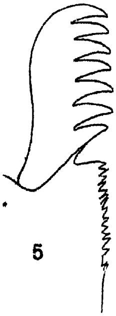

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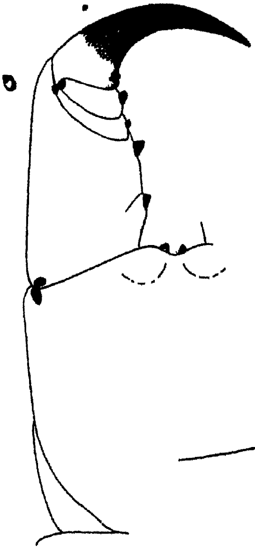

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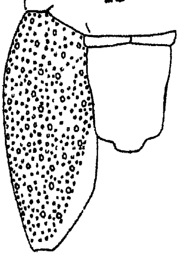

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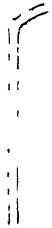

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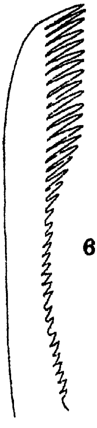

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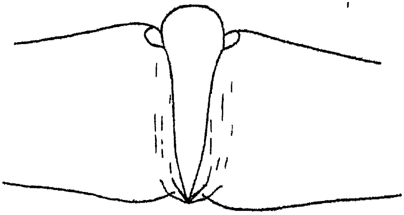

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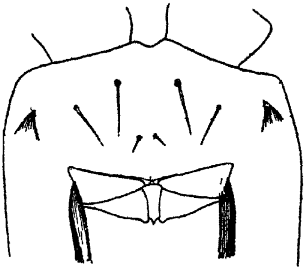
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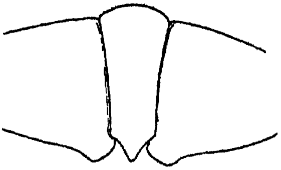
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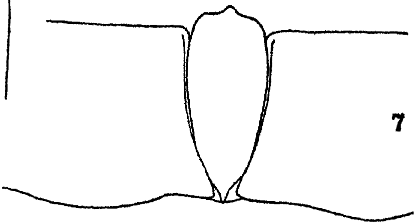
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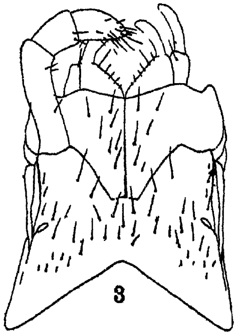
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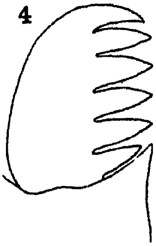
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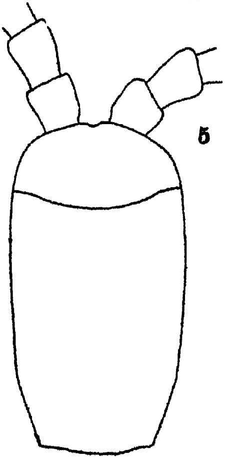
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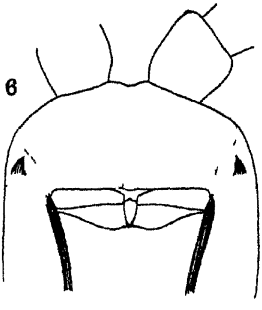
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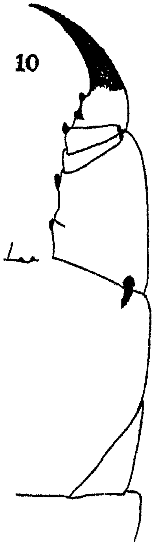
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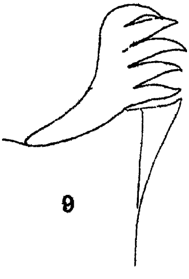
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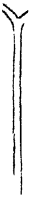
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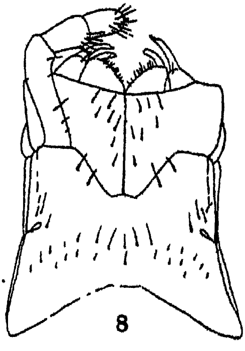
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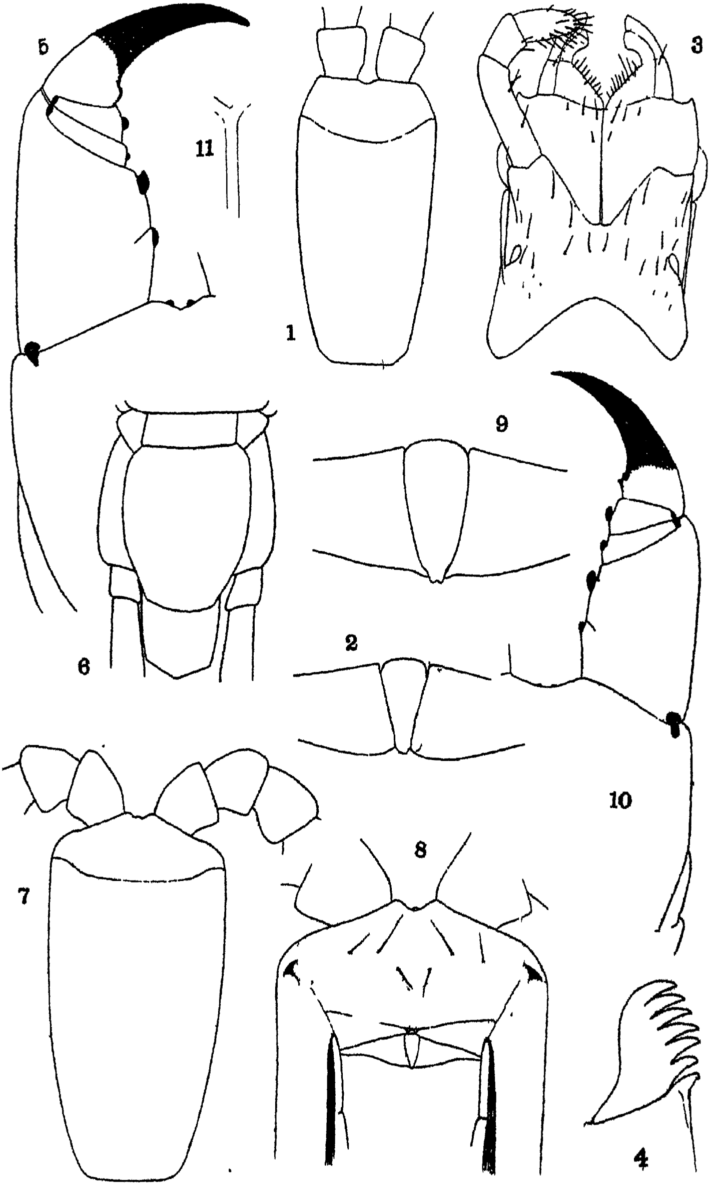
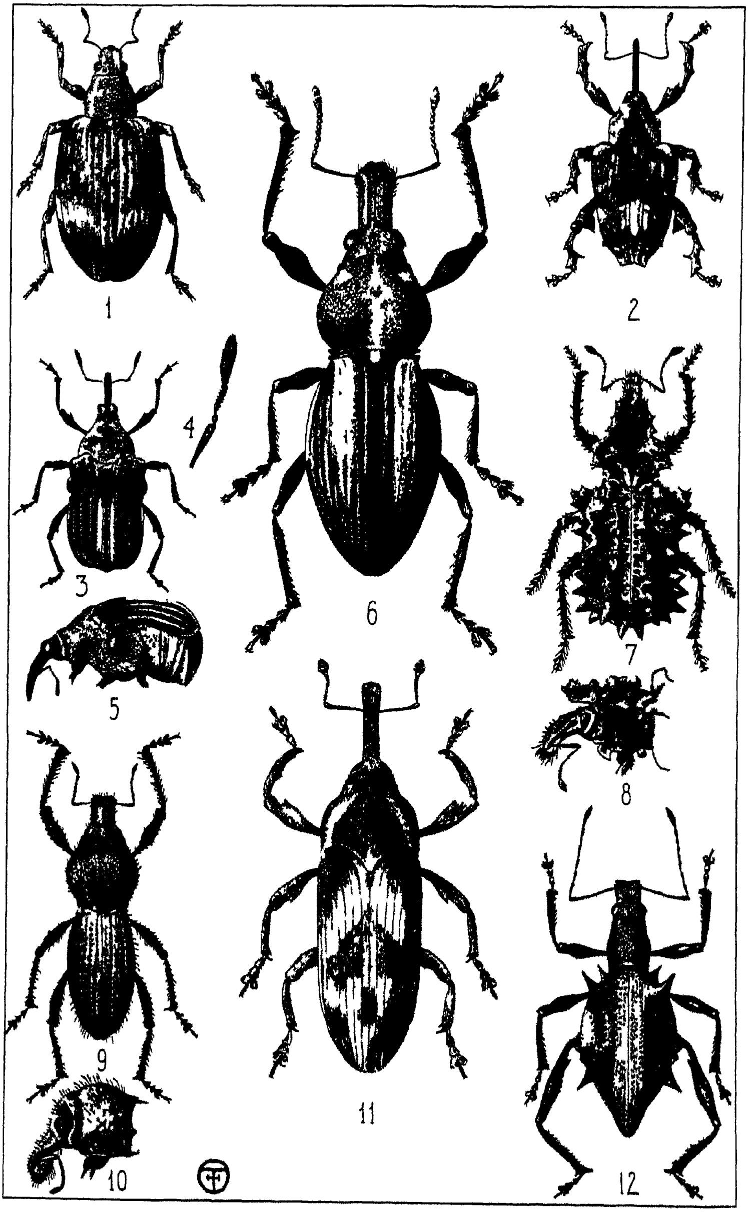
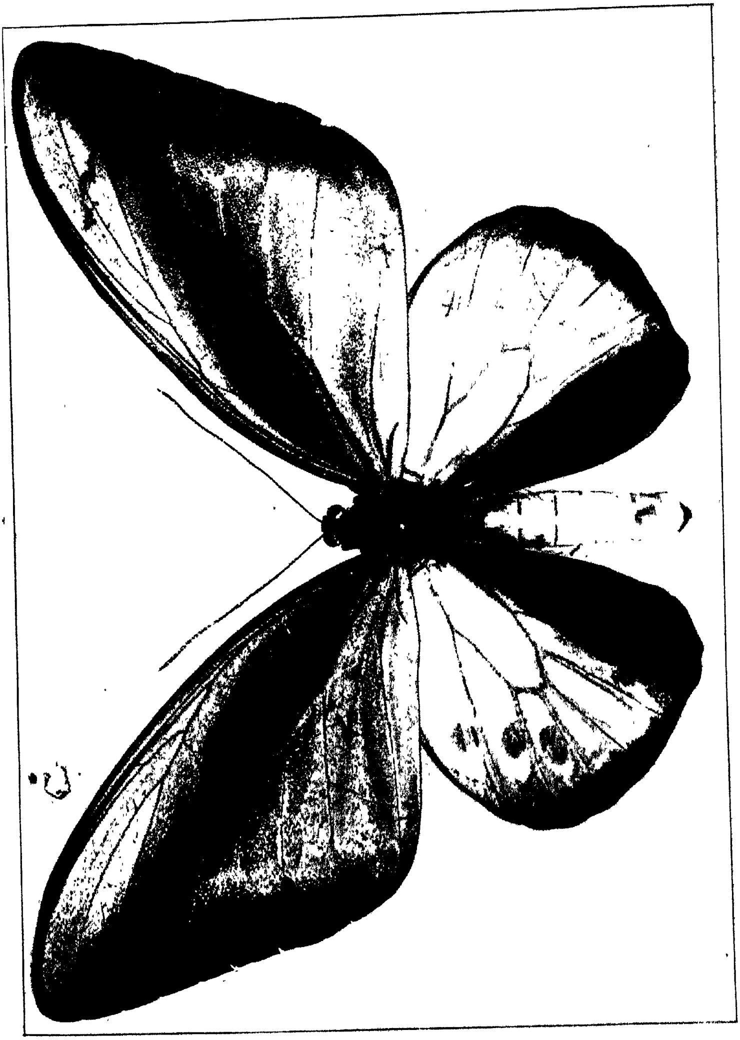
Ann. & Mag. Nat. Hist. S. 9. Vol. VI. Pl. XII.





New Curculionidæ from Africa.

TALBOT. *Ann. & Mag. Nat. Hist. S. 9. Vol. VI. Pl. XIV.*



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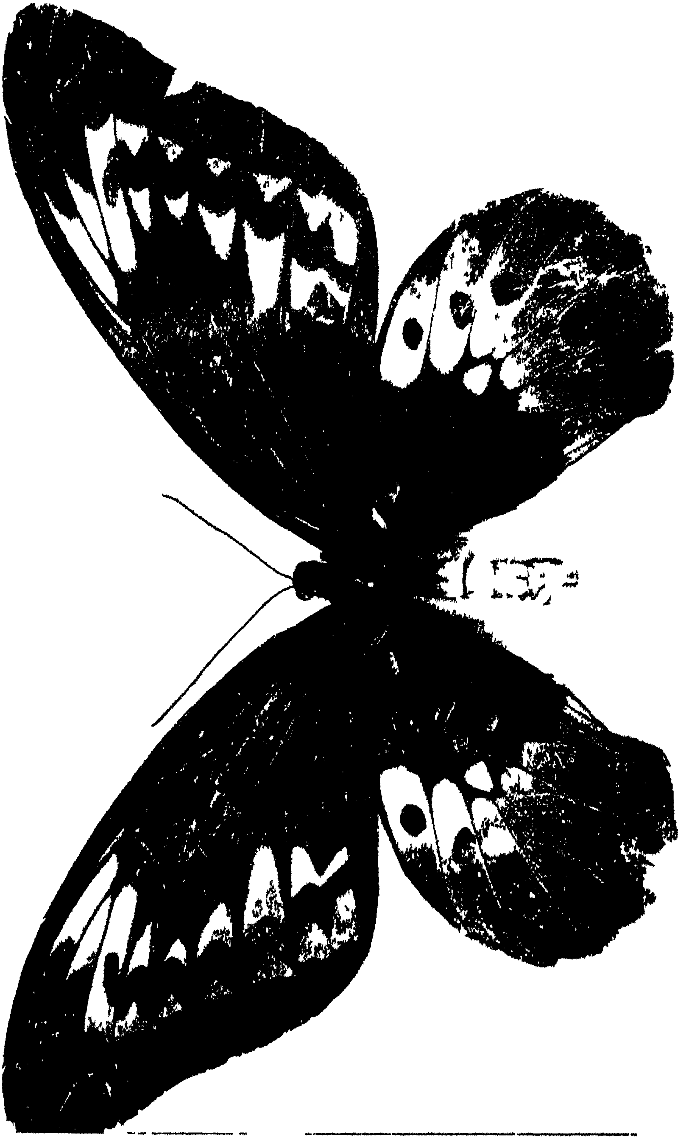

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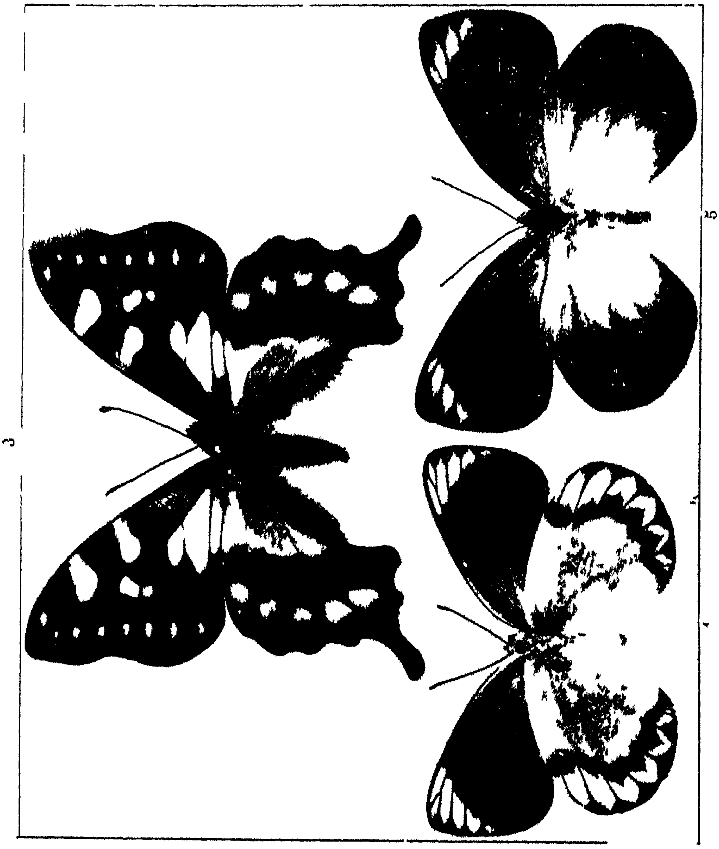
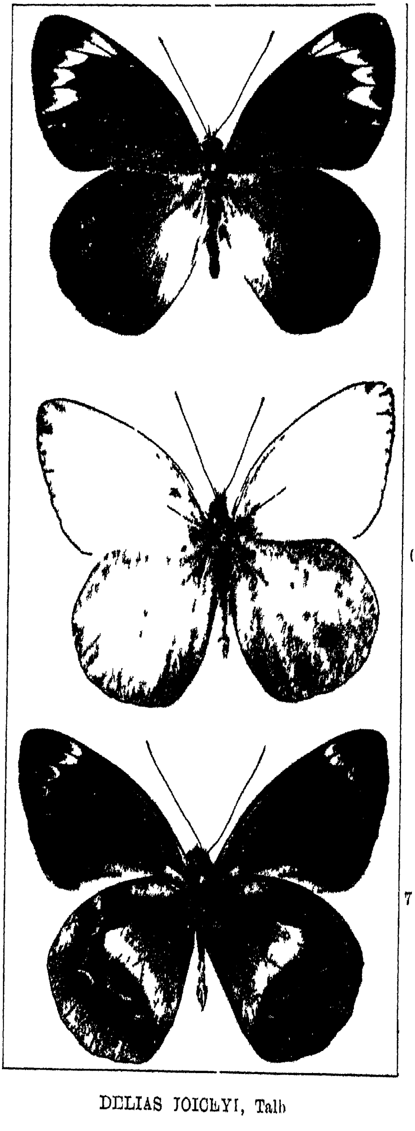


CENTRAL CERAM BUTTERFLIES



DELIAS JOICEYI, Talb

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Ann. & Mag. Nat. Hist. S. 9. Vol. VI. Pl. XVIII.

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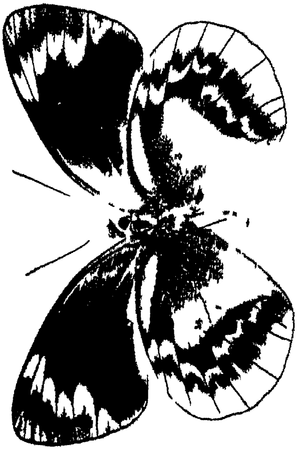

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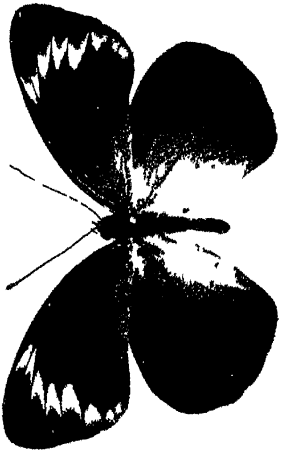

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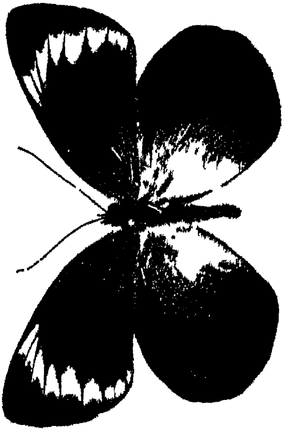

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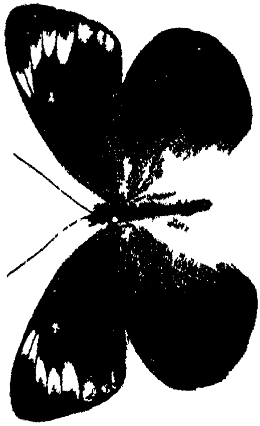
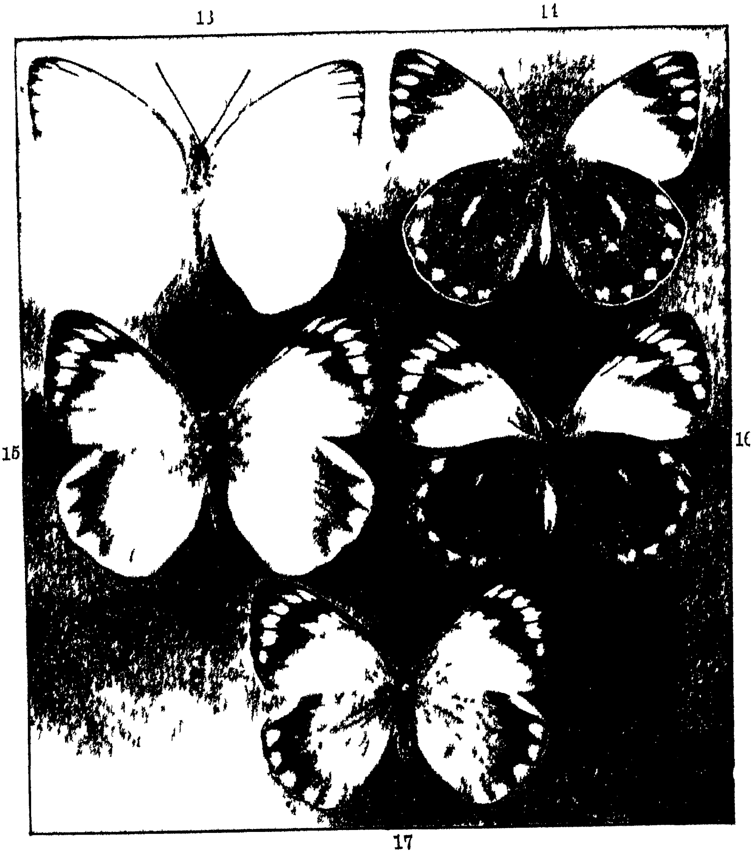


DELIAS JOICEYI, Talb.

TALBOT

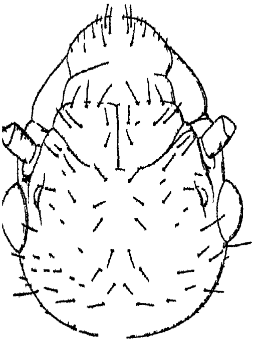
Ann. & Mag. Nat. Hist. S. 9. Vol. VI. Pl. XIX.



DELIAS MANUSELENSIS, Talb.

SILVESTRI

Ann & Mag Nat Hist. S. 9 Vol. VI. Pl XX



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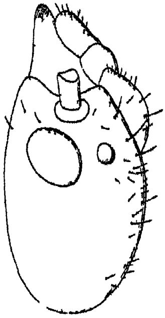

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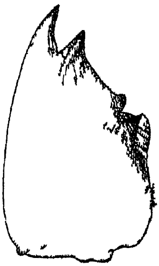

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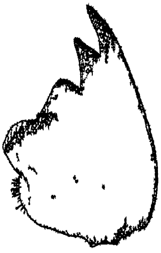

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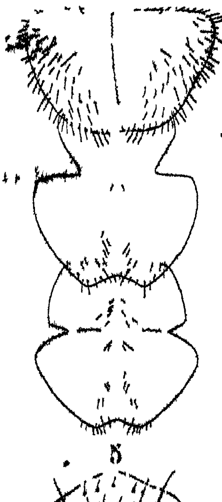

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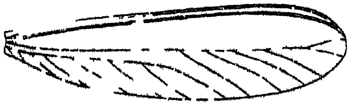

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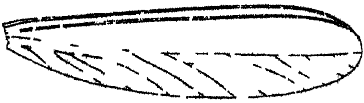

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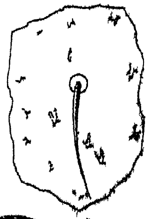

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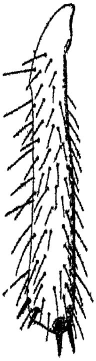

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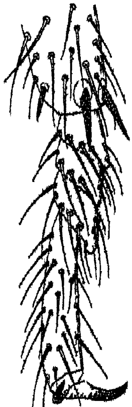

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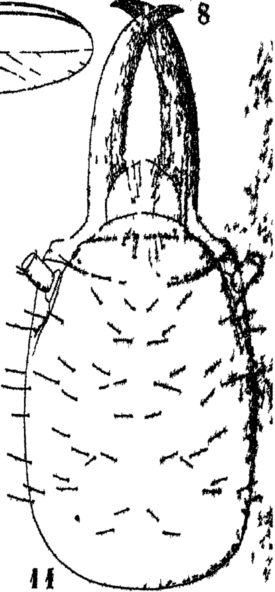

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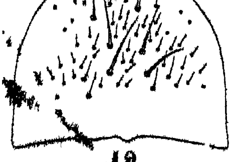

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